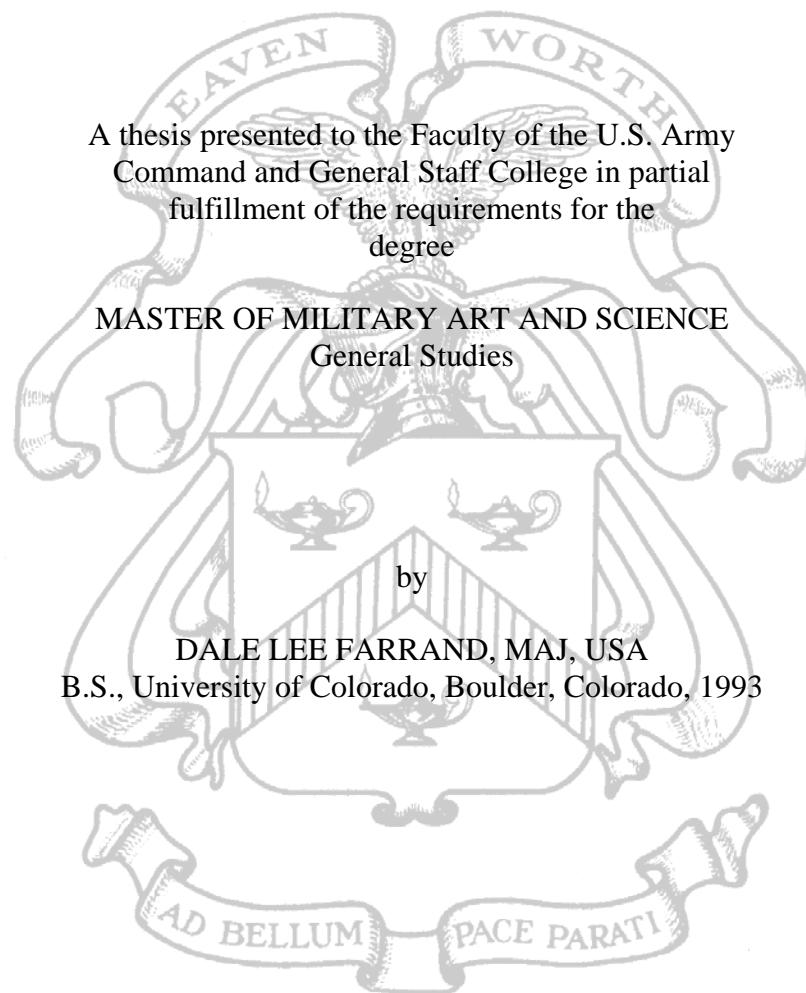


THE “REVOLUTION IN MILITARY LOGISTICS”: IS IT ENOUGH?



Fort Leavenworth, Kansas
2006

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REPORT DOCUMENTATION PAGE

*Form Approved
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1. REPORT DATE (DD-MM-YYYY) 16-06-2006		2. REPORT TYPE Master's Thesis		3. DATES COVERED (From - To) Aug 2005 - Jun 2006	
4. TITLE AND SUBTITLE The "Revolution in Military Logistics", Is It Enough?				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Dale L. Farrand				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Command and General Staff College ATTN: ATZL-SWD-GD 1 Reynolds Ave. Ft. Leavenworth, KS 66027-1352				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.					
13. SUPPLEMENTARY NOTES					
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15. SUBJECT TERMS Revolution in Military Logistics, Logistics Transformation					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified	UU	124	19b. TELEPHONE NUMBER (include area code)

MASTER OF MILITARY ART AND SCIENCE

THESIS APPROVAL PAGE

Name of Candidate: MAJ Dale Lee Farrand

Thesis Title: The “Revolution in Military Logistics”: Is It Enough?

Approved by:

_____, Thesis Committee Chair
David A. Anderson, D.B.A.

_____, Member
LTC Charles F. Hyde, M.S.

_____, Member
MAJ Mark G. Glowacki, M.B.A.

Accepted this 16th day of June 2006 by:

_____, Director, Graduate Degree Programs
Robert F. Baumann, Ph.D.

The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

THE “REVOLUTION IN MILITARY LOGISTICS”: IS IT ENOUGH? by MAJ Dale Lee Farrant, USA, 125 Pages.

This thesis conducts an analysis of the United States Army's changes in tactical logistics organizations and doctrine from 1999 to 2006 and compares them against published literature to determine if changes made have been revolutionary in nature and meet the goals established by Army leadership. Using military historians MacGregor Knox and Williamson Murray's definition of a Revolution in Military Affairs (RMA) as its measure, it determines if the collective changes in the doctrine, organization, training, mission, leadership, personnel, and facilities (DOTMLPF) of tactical logistics organizations meet the criteria for an RMA or are simply evolutionary in order to meet the challenges of the contemporary operating environment.

Based on qualitative analysis, it concludes that the United States Army is not making any revolutionary changes in the doctrine, training, materiel, or facilities of its logistics system. However, it is making revolutionary changes in the organization, leadership, and personnel of its logistics system. Finally, it concludes that based on the seven focus areas determined by the author for a Revolution in Military Logistics, the Army has achieved two and is on the path to achieving the other five, however, with no concrete timeline.

ACKNOWLEDGMENTS

First and foremost, I would like to thank my wife, Kristen, and my daughters, Corynn, Audrey, and Mckenna for providing me the inspiration to complete this thesis. Knowing that at the completion of this undertaking, I can spend endless time with them has made the long nights and early mornings endurable.

Second, to my research committee, Dr. David Anderson, LTC Chuck Hyde, and MAJ Mark Glowacki: thank you for enduring my operational technique in completing this thesis.

To my instructors, Mr. Phil Wyssling, MAJ Stan Moss, Dr. Alexander Bielakowski, and Mr. Jim Thomas: thank you for making the year a truly learning experience.

Finally, to Staff Group 1C: thank you for having the right mind-set during the year. Just in Time.

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ACRONYMS

ABCS	Army Battle Command System
ALMC	Army Logistics Management College
ALO	Authorized Level of Organization
AMC	Army Materiel Command
AO	Area of Operation
AOE	Army of Excellence
ARFORGEN	Army Force Generation
ASG	Area Support Group
AV 2010	Army Vision 2010
BCS3	Battle Command Sustainment Support System
BCT	Brigade Combat Team
BSA	Brigade Support Area
BSB	Brigade Support Battalion
CASCOM	Combined Arms Support Command
CLC3	Combined Logistics Captains Career Course
CLOAC	Combined Logistics Officer Advance Course
COCOM	Combatant Command
CSA	Chief of Staff of the Army
CSG	Corps Support Group
CSS	Combat Service Support
DISCOM	Division Support Command
DLA	Defense Logistics Agency

DOTMLPF	Doctrine, Organization, Training, Materiel, Leadership, Personnel, Facilities
DSA	Division Support Area
DSB	Division Support Battalion
EAB	Echelons Above Brigade
EAD	Echelon Above Division
FAD	Force Activity Designator
FSB	Forward Support Battalion
HEMTT	Heavy Expanded Mobility Tactical Truck
ILE	Intermediate Level Education
JPME	Joint Professional Military Education
JV 2010	Joint Vision 2010
JV 2020	Joint Vision 2020
LHS	Load Handling System
MSB	Main Support Battalion
ODS	Operation Desert Storm
OEF	Operations Enduring Freedom
OIF	Operation Iraqi Freedom
ONS	Operational Needs Statement
PLS	Palletized Load System
REF	Rapid Equipping Force
RFI	Rapid Fielding Initiative
RMA	Revolution in Military Affairs
RML	Revolution in Military Logistics
ROWPU	Reverse Osmosis Water Purification Unit

TRADOC Training and Doctrine Command

TTP Tactics, Techniques, and Procedures

USR Unit Status Report

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CHAPTER 1

INTRODUCTION

As I have said many times, there can be no revolution in military affairs without having a revolution in military logistics.

Gen Dennis J. Reimer, CSA (1995-1999), *Army Logistician*

Without a transformation in logistics, there will be no transformation in the Army.

Gen Eric K. Shinseki, CSA (1999-2003), *Government Executive Magazine*

Logistics transformation is critical as the Army adapts to the new realities.

Gen Peter J. Schoomaker, CSA (2003-Present), *White Paper: Joint and Expeditionary Logistics for a Campaign Quality Army*

Overview

During the Mexican Punitive Expedition of 1916, General John “Black Jack” Pershing led a force of 10,000 men into Mexico to capture or destroy General Francisco “Pancho” Villa and his army in retaliation for numerous attacks on American citizens. General Pershing’s supply route ran from Fort Bliss to San Antonio, Texas. His supplies were initially delivered by horse drawn wagon trains. Food and horse fodder were the most demanded supply items. By the end of the expedition in 1917, General Pershing received supplies from armored truck companies, commanded by Army captains and manned with civilian drivers and mechanics (Rutenberg 1985, 57-59). This drastic change in the way the United States Army was supplied signaled the start of a revolution in military logistics mirroring the Army’s change to maneuver warfare. Unfortunately, the form of warfare in which the United States engaged during the First World War

stopped the revolution in its tracks. The 30 months during which the United States fought in World War I, although utilizing new technologies, did not involve a revolutionary style of warfare. As a result of its victory, the United States focused very little on developing its military during the Interwar Period (between World Wars I and II). It focused on developing its logistics structure even less.

World War I marked the first time the United States fully mobilized for war. Although it had fought “small wars” between 1865 and 1917--or the first time, the United States fought a war external to its continental borders that required economic mobilization on a grand scale (Rutenberg 1985, 59). The United States observed The Great War develop during 1915 and 1916 before entering in 1917. As a result, it was able to ramp up its industrial base to meet the requirements of waging war. Most supply personnel arrived in theater unopposed before combat troops and established a system of railroads, ports, and warehouses over the course of a year (Waddell 1994, 299). General Pershing, now the AEF Commander, remembered the lessons learned in 1916 and as a result, established a series of progressive supply depots inland. Supplies were moved primarily using three methods: railroad, horse-drawn wagons, and motorized vehicles. The combination of three means of transport ensured the AEF was well supplied by redundant means during a largely immobile war fought on a single continent (Rutenberg 1985, 69).

During the interwar period, the United States Army’s logistics construct remained largely unchanged. This mirrored its armed forces in general. When war in Europe broke out, the Army conducted the Louisiana Maneuvers with 342,000 troops participating, but all that was concluded in terms of logistics was that it “had to be decentralized and the G-

4 . . . had to work closely with the G-3 staff officer to know the general plan of action.”

Clearly logistics was not going to be a consideration when developing any future course of action (Waddell 1994, 300).

The Second World War, in contrast to the first, consisted of numerous opposed landings in the European, African, and Pacific theaters of operation. *Operation Overlord* highlights the Americans’ failure to learn logically from Word War I. After the landings in June 1944 and fierce fighting through November, the Allies were at a decision point--move east and pursue the rapidly retreating German forces into their homeland or move west and capture more ports. Unfortunately, the decision was simple--with only 132 of the 240 required truck companies even *in existence*, the Allies had to open more ports to shorten lines of communication and ease the burden on the few ports waiting for their holding yards to be cleared by limited transportation assets. Had the Allies possessed the required transportation support to cover the 450-mile lines of communications, perhaps the United States Army would have had Christmas in Berlin. Instead, it would fight the Battle of the Bulge and the war in Europe would last an additional six months (Denny 2003, 5-27). Logistics units simply could and did not keep pace with European armored warfare.

At the conclusion of the Persian Gulf War in 1991, the U.S. Army suffered from the same issues that plagued it 46 years earlier. Similar to the First World War, the 22nd Support Command, supporting CENTCOM, ARCENT and the 3rd Army’s ground campaign, established two theater reception bases and an operational sustainment base in order to receive forces into theater and prepare them for combat operations. To support the movement of combat forces, the 22nd Support Command established convoy support

centers along the main supply route and four additional sustainment bases with two more planned (Lafferty et al. 1995, 10-22). Although Operation Desert Storm (ODS) was a success, with a decisive victory obtained in a mere 100 hours, the support was not realized efficiently. Had the war lasted longer or the lines of communication extended any more rapidly, logisticians would have been significantly challenged in supporting the force. Even Forward Support Battalions, the most mobile of the combat service support (CSS) organizations required external transportation support in order to move the massive amounts of supplies. There were simply not enough transportations assets to go around. According to the Combined Arms Support Command (CASCOM), there were 27,000 unopened and unidentified shipping containers in the theater at the end of the war—a literal “iron mountain” (Myers 2004, 41). It would take more than 120 days to retrograde those supplies.

In 1991, the Army’s Deputy Chief of Staff for Logistics (Army G-4) was tasked by the Army Vice Chief of Staff to develop a program to that would correct the logistic deficiencies identified in ODS. The RAND Corporation, working through its Arroyo scientists, was commissioned to research the challenges to Army logistics, and to identify ways to resolve problems. In 1994, the study, *Velocity Management: An Approach for Improving the Responsiveness and Efficiency of Army Logistics Processes* was published. According to the study, “Velocity management (VM) was a concept for dramatically improving the responsiveness and efficiency of the Army logistics system.” (Dumond et al. 1994) VM proposed to do this by substituting the “just in case” logistics system that produced the massive amount of excess supplies during ODS with a “just in time” or more-efficient system. VM would accomplish this by “substituting velocity and accuracy

for mass in the logistics system.” (Dumond et al. 1994). The “velocity” would be achieved by adopting proven business techniques similar to those of Federal Express (FEDEX) and United Parcel Service (UPS) (Dumond et al. 1994). The Army accepted the RAND proposal, and it was implemented Army-wide in 1995. Two simultaneous events helped the Army adopt VM.

First was the massive reduction of forces as a result of the end of the cold war--the Army reduced its end strength from 780,000 to 480,000 active duty soldiers--from 18 divisions to 10. In order to maintain an adequate amount of combat forces, a large number of CSS units were transferred to the reserve component. The Army had lost some of its ability to provide tiered support to combat forces. Second was the conversion of divisions from Army of Excellence (AOE) divisions to Force XXI divisions. According to top Army leadership, it believed it was about to undergo a Revolution in Military Logistics.

Subsequent RAND studies published in 1994, 2000, and 2001 “proved” that VM worked. *Accelerated Logistics: Streamlining the Army’s Supply Chain* (2000) reported that the Army cut order ship time (OST) overall by 67 percent and at some installations by as much as 75 percent (Yang 2000, 29). *Velocity Management: The Business Paradigm That Has Transformed U.S. Army Logistics* (2001), reported that between 1995 and 2000, the time it took a unit to receive supply requisitions dropped by over 50 percent and demand satisfaction improved from 5 percent in 1995 to just under 50 percent in 2000 (Dumond et al. 2001, 27-29).

Application of this concept meant that support battalions could maintain smaller stocks of supplies, knowing that transportation units would deliver them supplies (which

they would often transfer directly to their customers) just in time from higher levels of support. By reducing stocks, the Army was saving millions of dollars. The time was right to convert division level support battalions by increasing transportation assets and reducing supply capability. Reserve and National Guard units were converted to transportation units. Combat service support (CSS) structures and command and control (C2) relationships were changed. The combat arms commanders at the brigade level had more tactical control of the CSS units supporting them. Additionally, the Army learned that it would and could fight successfully as part of a joint force and planned to transform its logistics to meet the requirement to operate “jointly.” But was the Army undergoing a revolution or just evolving the way it supplied itself?

Between 1991 and 2003, the Army participated in five major operations. The defining characteristic of those operations was that they involved units no larger than a division-size operating in an undeveloped theater and on a non-linear battlefield. The concept of Distribution Based Logistics was being successfully applied, but did the Army stop evolving?

On 18 December 2003, the General Accounting Office (since renamed the Governmental Accountability Office) published *Defense Logistics: Preliminary Observations on Effectiveness of Logistics Activities During OIF*. The report’s general findings indicate that despite the overall success of the combat phase of *OIF*, there were substantial sustainment problems that revolved mainly around four areas: poor asset visibility; insufficient and ineffective theater distribution capability; failure to apply lessons learned from previous operations; and other logistics issues (lack of spare parts, cannibalization of equipment, and unreliable DoD contractors) (GAO 2003, 3-5) and that

“OIF highlights a problem identified during ODS that remains to be solved” (GAO 2003, 3-5).

A backlog of hundreds of pallets and containers of materiel at various distribution points due to transportation constraints and inadequate asset visibility; a discrepancy of \$1.2 billion between the amount of materiel shipped to Army activities in the theater of operations and the amount of materiel that those activities acknowledged they received; a potential cost to DOD of millions of dollars for late fees on leased containers or replacement of DOD-owned containers due to distribution backlogs or losses; the cannibalization of vehicles and potential reduction of equipment readiness due to the unavailability of parts that either were not in DOD’s inventory or could not be located because of inadequate asset visibility; the duplication of many requisitions and circumvention of the supply system as a result of inadequate asset visibility; and the accumulation at the theater distribution center in Kuwait of hundreds of pallets, containers, and boxes of excess supplies and equipment that were shipped from units redeploying from Iraq without required content descriptions and shipping documentation. For example, at the time we visited the center, we observed a wide array of materiel, spread over many acres, that included a mix of broken and usable parts that had not been sorted into the appropriate supply class, unidentified items in containers that had not been opened and inventoried, and items that appeared to be deteriorating due to the harsh desert conditions. (GAO 2003, 3-5)

The supplies were on the ground in the theater but the Army did not have the ability to process and distribute those supplies to the forward units. This critical aspect of the Army’s distribution system, the ability to rapidly move supplies, that is crucial to the VM concept failed. The VM system that has worked so well for the garrison Army since 1995 failed during OIF.

The revolution eluded to earlier was formalized in 1999, by four General Officers--the Chief of Staff of the Army, the Army Materiel Commander, the Army G-4, and the CASCOM Commander. In two articles in *Army Logistician* magazine, they announced that the Army was undergoing a Revolution in Military Logistics (RML), defined by six tenets--a Seamless Logistics System, Distribution-Based Logistics, Agile

Infrastructure, Total Asset Visibility, Rapid Force Projection, and an Adequate Logistics Footprint (Reimer 1999, 2).

The first fully realized concept of the RML was the creation of the Force XXI Division with its supporting Division Support Command (DISCOM). Force XXI logistics reflected a paradigm shift from a supply-based CSS system to an advanced distribution-based CSS system. It combined situational understanding capabilities with efficient delivery systems to form a seamless distribution pipeline. This pipeline represented "inventory in motion" and the CSS imperative of increased velocity. The Force XXI distribution-based system eliminated most stockpiles; substituting speed for mass. Direct throughput from theater and corps to the brigade battle space was the rule rather than the exception with distribution based CSS. Extensive use of "hub-and-spoke" transfer nodes reduced transportation and materiel handling requirements. The creation of multi-functional CSS companies within the Force XXI FSB consolidated CSS organizational elements currently embedded within AOE maneuver battalions with the direct support capability currently in the AOE FSB. To compensate for this consolidation, the DISCOM and its subordinate units have increased the scope and magnitude of their CSS mission. The Main Support Battalion (MSB), with the mission to provide reinforcing support for all CSS functions to the FSBs was replaced with a Division Support Battalion (DSB)--capably of providing 1/2 day reinforcing Class III (B) and transportation support to the FSBs--with its primary mission oriented to non-maneuver divisional units. Inherent to all these changes was a decrease in the amount of supplies carried forward in the division area and an increased dependence on EAD assets to throughput supplies to the DISCOM using "velocity management."

Since the RML was first introduced in 1999, the only significant document that has been published was the *United States Army's 2004 Army Transformation Roadmap*, published in July 2004. The Transformation Roadmap addresses logistics as a concept that focuses on four areas: a Logistics Data Network, Responsive Distribution System, having Robust, Modular Force Reception Capability, and an Integrated Supply Chain (Transformation Roadmap 5-10 through 5-12). These focus areas differ from the six tenets of RML--but do they take them into account, have they changed, or are they just irrelevant?

The realization of this 2004 document is currently ongoing in the following ways. First, the DISCOM no longer exists. A Sustainment Brigade--an organization tailored to a specific mission and set of forces--has replaced it. The Sustainment Brigade is no longer organic to a division, but works for the senior logistician in the theater of operations. The senior logistician normally works for the land component commander. The MSB and DSB no longer exist within the division as well. In fact, the only logistics organization within a division is a Brigade Support Battalion (BSB), organic to a Brigade Combat Team (BCT). The BSB requires echelon above brigade (EAB) support in order to sustain the BCT.

The Army has mitigated the risk associated with the dissolution of the division's organic support brigade by providing BSBs more capability than their predecessors. They have more staff capability, more distribution capability, and more ability to provide field services. They have multifunctional support companies able to provide dedicated support to each combat arms battalion in the BCT. Finally, the BSBs are now a permanent part of the BCT's organization.

As stated by the last three Army Chiefs of Staff--a revolution or transformation in military logistics is an integral and necessary part of a revolution in military affairs (RMA)--and the Army has been undergoing a self-proclaimed revolution of one form or another since 1999, so one must examine RMAs. MacGregor Knox and Williamson Murray in their book, *Dynamics of Military Revolution*, define a Revolution in Military Affairs as follows: Revolutions in military affairs require the assembly of a complex mix of tactical, organizational, doctrinal, and technological innovations to implement a new conceptual approach to warfare or to a specialized sub branch of warfare (Knox and Murray 2001, 12). They also posit that there have been five RMAs in modern times. They are:

1. The early modern revolution
2. The Napoleonic revolution
3. The Industrial Revolution
4. The First World War
5. Nuclear weapons (Knox and Murray 2001, 13)

The Department of Defense concurs with their definition of an RMA. According to the Secretary of Defense's Office of Net Assessment: A Revolution in Military Affairs is a major change in the nature of warfare brought about by the innovative application of new technologies which, combined with dramatic changes in military doctrine and operational and organizational concepts fundamentally alters the character and conduct of military operations (The Information Warfare website). So if we agree that the last RMA that affected conventional warfare was the First World War, are we now in the midst of the next RMA?

Now the opportunity exists to change the present and provide direction for the future. With current technologies, the Army is able to take lessons learned from units in combat, apply it in Iraq and provide training outlines for deploying units. But has the progress or planned progress in the above-mentioned tenets combined been enough to call the changes being made to logistics revolutionary or just evolutionary? As the Army transforms, will it make the same mistakes it made during the Interwar Period (1917-1941) and neglect logistics units? Will it develop logistics units capable of sustaining the force over a protracted conflict in light of competing demands?

Research Questions

The primary question to answer is whether the Army's Revolution in Military Logistics is truly a Revolution in Military Affairs as defined above.

In order to answer this question, it is necessary to know how the Army plans to execute its RML. Hence, a second research question that will define the Army's plan of attack is: Based on publications between 1999 and 2004, what are the tenets of the RML? A third research question that will address its progress thus far is: What specific changes has the Army made to its doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF) of logistics units to achieve its desired end state in the six tenets?

Limitations and Delimitations

The major limitation of the research is that the Revolution in Military Logistics as a concept is too vast and too holistic to be covered by a paper of this scope. It is a concept that has been in one form of genesis or another since 1991 and spans the next 15 years.

Therefore, it is necessary to focus research on a specific organization, structure at a given time, and published doctrine. There were four delimitations for this weakness. The first was--when comparing pre-RML and current logistics design--to focus specifically on the doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF) aspects of tactical logistics units. The second was to focus on the following organizations: the Sustainment Brigade, whether replacing a division, corps, or theater-level organization; and the Brigade Support Battalion for any type of brigade. The third was to focus only on tenets of the RML published in official Army publications. The fourth was to focus on the most current published doctrine, even if it is an interim publication. Examples include: FM-I 4-0, *Combat Service Support*, and FM-I 4-90.1, *Heavy Brigade Combat Team Logistics*.

Significance of Research

This thesis began as an attempt to answer the question: Does the Army's current distribution based logistics model adequately address lessons in tactical logistics learned as a result of recent operations? In order to answer this question, secondary and tertiary questions first had to be answered. What were the lessons learned as a result of *Operations Desert Storm*? How were those lessons applied to doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF) of logistics units? What were the lessons learned as a result of operations between 1991 and 2003 and how were they applied as well? What were the lessons learned as a result of *Operation Iraqi Freedom*? Finally, what did or didn't the Army do right?

What was discovered during initial research was that these questions have already been asked and answered. Army logisticians recognize that the commercial practices

adopted as a result of *ODS* did not work well during *OIF* yet they had some value. As a result, the Army is currently reviewing and where necessary, changing its logistics construct. An analysis and subsequent recommendations on how to change a currently transforming system is irrelevant.

For all intensive purposes, however, this transformation seems evolutionary rather than revolutionary and as emerging technologies are leveraged, military logistics will reach the point where it can get no more efficient using current doctrine and command structure. So the next logical step to explore is how to revolutionize military logistics.

CHAPTER 2

LITERATURE REVIEW

Nothing has been written to date that analyzes the RML *as it currently stands* to determine if it is a revolutionary change. This is in large part due to the fact that Army logistics doctrine has evolved and is evolving. However, much has been written about the military operations that predate the contemporary operating environment, earlier iterations of logistics structure and doctrine changes, the logic behind those decisions, and various views of logistics in the future.

The review of literature will focus on seven areas: lessons learned from military *Operations Desert Storm, Iraqi Freedom* and every operation in between, Force XXI Logistics Redesign, The Revolution in Military Logistics, Distribution Based Logistics, Focused Logistics, commercial business practices, and the Revolution in Military Affairs. Presented is a chronological synopsis of the defining events in the genesis of the Revolution in Military Logistics (RML) and the documents that facilitated or described the changes that resulted from those events. The intent was to provide an understanding of the current state of the RML and how this state evolved over time. Also reviewed are works dealing with commercial logistics.

Operation Desert Storm-Operation Iraqi Freedom Lessons Learned

What many consider the seminal work on *Operation Desert Storm* logistics is the book, *Moving Mountains* by LTG (R) William Pagonis, published in 1994. Gulf War veterans for a couple of reasons have criticized this book. First, it is written from the point of view of a theater level and glosses over the numerous differences in the way

logistics was conducted by divisions and even corps. Second, it is not an objective account of the Gulf War as its author was the 22nd Support Command commander who validates the course of action that put him in charge of the largest logistics command at the time. Regardless, *Moving Mountains* is a significant piece of work and must be considered when analyzing Gulf War logistics.

Two research papers were published at the same time as *Moving Mountains* and they round out the literature considered for this thesis. They include: *Gulf War Logistics: Theory Into Practice*, published by a committee of 15 officers of the Air Command and Staff College in 1995 and *Desert Shield / Storm Logistics*, published by now MG Mitchell H. Stevenson as a study project while at the Army War College in 1993. *Desert Shield / Storm Logistics* is validated as an important piece of work due to MG Stevenson's success as a logistics officer and reputation as an intellectual on the art of supporting the Army.

Finally, three recent research papers from the School of Advance Military Studies (SAMS) address ODS logistics and compare them to OIF logistics in order to determine the successful application of lessons learned from the Persian Gulf War onto tactics, techniques, and procedures during the second Gulf War. They are: *Operational Logistics*, published in 2001 by MAJ Michael Lopez, *Army Battlefield Distribution Through the Lens of OIF* by MAJ Eric Shirley, and *Class III (Bulk) Distribution Successes* by MAJ Bernard Moxley, both published in 2005.

The following summarizes the lessons learned from this literature. Logistics units in general arrived in theater too late to make a difference and where unable to effectively manage the iron mountain of supplies that had been created by units padding supply

requisitions. This was compounded by long wait times for supplies coming from the Continental United States (CONUS), a lack of pure-pack shipments of supplies--supplies bound for numerous locations were shipped together--and the lack of adequate cargo handling units and equipment which led to double handling of supplies without the appropriate organizations to do so. In order to counter this, non doctrinal solutions were created, such as the "Desert Express," similar to the "Red Ball" Express during World War II, and a series of logistics bases to support the advance of maneuver forces.

Operations following *ODS* have had the advantage of the Center for Army Lessons Learned. The Center for Army Lessons Learned (CALL) collects and analyzes data from a variety of current and historical sources, including Army operations and training events, and produces lessons for military commanders, staff, and students. CALL disseminates these lessons and other related research materials through a variety of print and electronic media.

After Action Reports have been the primary resource for reviewing logistics lessons learned for post *ODS* operations. The CALL Combined Arms Assessment Team produced 16 reports and CALL produced Newsletter # 97-01 that detailed lessons learned, tactics, techniques, and procedures from operations in Bosnia-Herzegovina during *Operation Joint Endeavor*. The issues addressed in those publications include the following. Total Asset Visibility (TAV) and In-Transit Visibility (ITV) of supplies are critical and expected of combat commanders. Split based logistics operations are not easily accomplished with current organizations. Local procurement of materiel must be considered in any theater as a source of supply. Finally, Supply Support Activities (SSA)

are the crucial point of friction on the logistics battlefield and their success or failure contributes to the success or failure of the operation.

Operation Enduring Freedom produced a few lessons learned found in CALL archives. Those lessons reinforced the importance of TAV and ITV and emphasized that in order to be effective to combat commanders, it must be real time data. Additionally, contractors on the battlefield became an asset, liability, and required consideration on the modern battlefield.

Finally, *Operation Iraqi Freedom* has the most abundant amount of literature devoted to it of modern Army operations. Although there is no work that focuses strictly on logistics like *Moving Mountains*, *On Point*, the Combat Studies Institute's record of *Operation Iraqi Freedom* does address logistics lessons learned, albeit briefly. After action reports from the following units are available through CALL and all provide some insight into logistics lessons learned during *OIF*: V Corps, 1st Armored Division, 3rd and 4th Infantry Divisions, 82nd Airborne Division and the 101st Airborne Division. Finally, as mentioned before, the SAMS research papers *Army Battlefield Distribution Through the Lens of OIF*, *Class III (Bulk) Distribution Successes*, and *Class IX Supply Operations in OIF*, published in 2004 by MAJ Ted Stuart all address logistics successes and failures realized during *OIF*.

The following lessons learned were gained from the literature above. First, the Army had again failed in the cargo transfer business, this time in training and equipping the units it had created following the first Gulf War. Second, in eliminating the iron mountain created during *ODS*, it had made supply stocks too lean and units once again padded supply requisitions to ensure adequate resupply while conducting combat

operations. The Army overestimated the efficiency of its transportation assets and underestimated the effects of combat loading and the desert environment on equipment. Finally, it realized that it lacked an end-to-end distribution process owner, which led to repackaging, multiple handling and unnecessary delays on delivery of supplies.

Force XXI Logistics Redesign

Force XXI is defined by the United States Army as the campaign to understand and develop those capabilities needed to meet the challenges of the twenty-first century while fulfilling today's operational demands. In practicality, Force XXI was applied to the 4th Infantry Division between 1998 and 2000 as the Army's Experimental Force. Literature in regards to Force XXI logistics comes in two flavors. The first is the organization and doctrine of Force XXI units. The second is an analysis of how well Force XXI logistics will work on the modern battlefield.

It is necessary to examine Force XXI logistics briefly as it was the Army's first attempt at logistics transformation following its 1999 publication of the RML. While it has been abandoned in favor of the new modular design of Army units, the basis for new logistics organizations and concepts of the transforming force lies with Force XXI.

Before looking at an analysis of how well Force XXI logistics worked, it is logical to look at how the structure changed from AOE logistics. Organizations of Army units are codified using Modified Tables of Organization and Equipment (MTOEs). All Army MTOEs are available from the U.S. Army Force Management Support Agency. Doctrine of Army units is codified in field manuals (FMs). Four field manuals (FM 4-93.50 through FM 4-93.53) describe *Tactics, Techniques and Procedures for the Forward Support Battalion, Division Support Battalion, Division Support Command, and Aviation*

Support Battalion (Digitized), respectively. Applying the MTOEs to the FMs allows one to understand the concepts of Force XXI logistics. Of course, it is impossible to understand Force XXI logistics redesign without understanding the concepts of logistics prior to Force XXI. Therefore, MTOEs for pre-Force XXI logistics units along with FM 63-2, *Division Support Command, Armored, Infantry, Mechanized Infantry Divisions* and FMs 63-20 through 63-23, *Forward, Main and Aviation Support Battalion* allow us to understand Force XXI logistics redesign.

The following research papers turn a critical eye towards Force XXI logistics. *Force XXI Logistics* by MAJ Carl Bird, published by SAMS in 1998 and *Force XXI Logistics* by MAJ Mark Mongilutz, published by the Naval War College in 1997 both analyze Force XXI logistics' impact on Army operations. MAJ Mongilutz focused his analysis on how Force XXI logistics would affect operational distribution on the battlefield. He concluded that the structure and design of Force XXI logistics had real potential in revolutionizing the way combat units were supported--improving speed and responsiveness. However, it did not take into account operational distribution experiences of *ODS*. Additionally, it did not address warehousing and mobile storage capabilities--in attempting to provide more support forward by creating multifunctional CSS companies--Force XXI logistics provided less support to commanders at the strategic and operational levels. He concluded that in order for Force XXI logistics to work--robust logistics bases established immediately upon entry into theater and adequate transportation assets (more than organically assigned) must be present. He recognized that while Force XXI represented a cheaper way to operate--it was not robust enough to survive on the battlefield; that any emerging logistics concept must match the maneuver concept. Since

Force XXI could not be adequately tested during peacetime--it was prudent to retain redundancy in distribution.

Contrary to MAJ Mongilutz, MAJ Bird's analysis focused on how Force XXI logistics affected the BCT. He found nothing but benefits from Force XXI logistics, calling it a "bonanza" for the maneuver commander. He concluded that information systems provided the following benefits--increased visibility of supplies, allowing the CSS commander to anticipate and respond to requirements. Additionally, the common operating picture of the battlefield gave the CSS commander an advantage that improved the survivability of his assets by allowing him to avoid potential engagements. He saw the benefit that technology provided to the maneuver commander as well, allowing him to have a clear picture of his logistics status, which gave him more flexibility to conduct decisive operations. Finally, he concluded that the creation of FSCs provided maneuver commanders with habitual and continuous support and by creating support areas for each maneuver battalion vice brigade, the length of lines of communications (LOCs) were shortened. MAJ Bird's conclusions on the benefits of Force XXI logistics are based almost wholly on improved information systems vice on the structure and doctrine of Force XXI logistics.

The Revolution in Military Logistics

In order to obtain sound bites on the Revolution in Military Logistics, one needs look no farther than *Army Logistician*. *Army Logistician* is the official magazine for Army logistics. It is a bimonthly publication, prepared at the Army Logistics Management College and published by the Army Combined Arms Support Command for the Department of the Army. Its mission is to publish timely, authoritative information on

Army and Defense logistics plans, programs, policies, operations, procedures, and doctrine. Its purpose is to provide a medium for disseminating and exchanging logistics news and information and a forum for expressing original, creative, innovative thought about logistics support.

The Revolution in Military Logistics was first introduced to the Army community in the January-February 1999 issue. In that issue, several articles describe the six tenets that make up the RML: seamless logistics system, distribution-based logistics, agile infrastructure, total asset visibility, rapid force projection, and an adequate logistics footprint. They also introduce the concept of Focused Logistics and Joint Vision 2010. The Combined Arms Support Command is named as “spearheading” the RML. Finally, it is reinforced throughout the publication that the RML relies on enabling technologies and several new technologies are introduced.

In September-October 2000, *Army Logistician* updated the Army on the transformation in Army logistics, focused almost exclusively on distribution based logistics. In that journal, the RML is defined by three tenets instead of six: distribution velocity, not supply mass; near real time situational awareness; and a seamless logistics organization. Again, enabling technologies are key to the RML.

Finally, in 2004, three articles address a logistics revolution. The first, an article in *Army Logistician* by COL (R) Larry Harman states that in: creating a single, national-level project-and-sustain command; attaining unprecedented speed in operations; and achieving overwhelming force protection, we have a “short list” for achieving a logistics revolution. The second two articles, authored by LTG Claude Christianson, the Army G-4, address four focus areas that the Army will hold preeminent. They are: connecting

Army logisticians through an information network; developing a responsive distribution system; developing a rapid force reception capability; and developing an integrated supply chain with a single proponent.

Numerous research papers about the RML have been published since its introduction in 1999. A few noteworthy titles are: *Will the Force XXI RML Support Coalition Operations in 2010?* by Alan Cunningham (2000); *Logistics Transformation* by LTC Georgette Wilson (2002); *Logistics Transformation--Reducing the Logistics Footprint*, LTC Darrell Ransom (2002); *Transformation--Revolution in Military Logistics*, LTC Aundre Piggee (2002); and *Logistics Transformation--Restarting a Stalled Process* by LTC Victor MacCagnan (2005); all published by the United States Army War College. *Focused Logistics and Support for Force Projection in Force XXI and Beyond* by MAJ Scott Rubitsky (2000), published by SAMS; and *CSS Transformation* by LTC Kenneth Juergens (2002), published by the Naval War College round out an excellent set of products from Army logisticians.

Let us examine the conclusions drawn from this bevy of documents. By and large, they were all published in the period between when the RML was first introduced and present day (2000–2002 to be precise). Therefore, they offer a positive view of the RML with some caveats. A paper written in the past year with the benefits of OEF and OIF as a primer on the “failure” of the RML offers the one descending view.

Alan Cunningham examines in detail enabling technologies that increase velocity of supply distribution. He looks at three enablers--the Palletized Load System; the Load Handling System--both versions of the Oshkosh produced Heavy Expanded Mobility Tactical Truck (HEMTT); and platforms for those two trucks such as fuel racks,

container roll in-roll out platforms (CROP), and container handling units (CHU)--all of which increase distribution speed and decrease handling requirements. He analyzes how the use of these systems in past operations such as *Operation Joint Endeavor* in the Balkans is a prologue for future operations. He concludes that they are indeed enablers for a streamlined distribution system and that their use in supporting both joint and multinational forces is invaluable.

LTC Wilson examines the RML at a joint level--geared towards focused logistics. She is a fan of the RML, but cautions that transformation cannot proceed as a sole Army effort--it must be a joint effort. She makes the following recommendations: that logistics budgets, systems, exercises, and training should be developed jointly and that senior logistics leaders must engage senior military (vice Army) leadership on CSS transformation. It is here recommendation that the J-4 (again vice Army G-4) needs to lead the change. One comforting thought is that the former Army G-4, LTG Christianson is now the J-4. LTC Ransom like LTC Wilson believes logistics transformation can be achieved, but not without a change in expectations of commanders. He recommends the establishment of a senior logistician who controls distribution from the strategic to the tactical level. The purpose for this is to mitigate what is already an identified risk (and some would argue, shortfall) in logistics transformation--a reduction in CSS personnel of 60 percent, carrying capacity of 50 percent, and overall reduction of the logistics footprint. He concludes that distribution based logistics (DBL) must be fully implemented and enabling technologies fielded in order for a transformed logistics structure to work.

LTC Piggee concludes that the key to a successful implementation of the RML is to adopt business practices that leverage the advantages of technology and automation. He points out the advantage of having supplies ordered and delivered from a field unit to Army Materiel Command (AMC) depots that bypasses all the former levels of supply management. One of the technologies that LTC Piggee lauds is the Global Combat Support System-Army (GCSS–Army). Three years later, GCSS–Army has not been implemented in the Army and does not appear to be fielded anytime soon. Finally, LTC Piggee concludes, like LTC Ransom, that the Army must make quantum strides to bring technology, acquisition, and the logistics communities closer together to make RML a reality. LTC Juergens agrees with LTC Wilson that logistics transformation must occur jointly and specifically references joint exercises and training. He recommends that the Army put more emphasis on training of logisticians as it requires more understanding of commercial practices, technologies, and joint capabilities. He advocates increasing the opportunities for Advanced Civil Schooling, Training With Industry, and the creation of an incentive “master” logistician program. He is, however, concerned about the fact that logistics transformation is top driven and is concerned about the tendency to eliminate redundancy and safety stocks.

MAJ Rubitsky analyzes how the RML supports the Army After Next (renamed the Objective Force and now the Modular Force). He concludes that world-class performances by commercial organizations did not happen overnight and neither will the Army’s as it transforms. He identifies the following strategic distribution enablers that must be integrated into the force in order for the RML to work: C-17 aircraft; 19 large medium speed roll on-roll off (LMSR) ships; and 16,000 containers.

Finally, LTC McCagnan's paper--a significant publication written in the last year. LTC McCagnan concludes that logistics transformation as described previously has stalled. He believes this happened for a number of reasons--numerous changes in the definition of military logistics, failure to fully implement DBL, the start and stop acquisition process of enabling technologies, and finally, operational deployments. He portends that the following must happen to restart the logistics transformation process: first, realize that it has stalled and convince the senior leadership of this fact; second, leverage the experiences of commanders of tactical logistics units; third, realize that many correct changes were made since ODS--realize which ones were correct and keep them; and finally, stop the rhetoric, white papers, briefings, and get after the hard work of logically transforming the military.

Distribution-Based Logistics

Distribution-Based Logistics is one of the six tenets of the RML and became the cornerstone for the current logistics model. Again in the January-February 1999 issue of *Army Logistician*, Distribution Based Logistics is dissected. It is broken down into seven elements: value chain, readiness management, logistics interventions, distribution management, asset management, a two-way distribution network, and anticipation.

Distribution Based Logistics is a simple concept and does not require much research, however, there are three SAMS research papers that address that concept and battlefield distribution. They are *Distribution-Based Supply System* by MAJ Steven Wade (1999); *Battlefield Distribution: A Systems Thinking Perspective* by MAJ Paul Rodgers (2005); and *Transforming for Distribution Based Logistics* by MAJ Colfield Hilburn (2005).

MAJ Wade's conclusions are that the current supply based system is not an integrated system and that DBL must be integrated in order to work. One of the problems he states with a supply-based system is that each node and mode (of supply and distribution) has a different metric for performance and that again, this must change. He believes that, because logistics in general is not perfect, there is a lack of confidence in any system and that often work-around solutions are developed that counter an effective system. Like current operations have proven, he also believes that just-in-time logistics does not work. He recommends, like many others, that a single process owner for distribution be created. He does believe in commercial practices and sites them, but unlike some other fans, focuses on customer-business interface, rather than the science of distribution. He concludes that in order for most businesses to transform requires a combination of organizational and technological change.

MAJ Rodgers examines battlefield distribution from a systems thinking perspective. His conclusion is that logisticians cannot fix current distribution problems until they realize distribution is a system with a cause and effect relationship. He analyzes German Army transformation during the Interwar Period and U.S. Army transformation between *ODS* and *OIF*. He concludes that velocity management (VM), a business practice proposed in aforementioned RAND studies, fails because it is dependent on the cause and effect relationship. Although VM works in a garrison environment, it will not work when deployed. MAJ Rodgers proposes that units must be able to shift between VM and battlefield distribution flawlessly. This has already proven unsuccessful during *OIF*. He does recognize that there are not enough distribution assets within the Army and recommends the immediate procurement of transportation assets. Finally, MAJ Rodgers

proposes a practical fix to the understanding of distribution by again educating logisticians. He believes that graduate level systems analysis should be taught to logisticians during professional military education. His second

MAJ Hilburn concludes that the major problem with the supply based logistics structure is that it views supply and transportation as two separate functions rather than two elements of a common distribution system. That the Army has recognized that is not enough. It must actually make great “leaps” if it is to fully realize DBL. He contends that new technologies, doctrine and adopting business practices are not enough without a dramatic reorganization of logistics forces. One business practice that can be adopted in order to realize DBL is the elimination of “function-oriented management”. In short, a centralized command with an end-to-end focus must replace the echeloned management of distribution management at the strategic, operational, and tactical level. MAJ Hilburn proposes the following: creation of a unified distribution combatant command and establishing distribution as a functional area for logistics (FA 90) officers. This is an interesting proposal in light of current discussions about a “logistics corps” within the Army.

Focused Logistics

When we begin to discuss Focused Logistics, it is necessary to introduce *Logistics Spectrum*. The *Logistics Spectrum*, is the official publication of The International Society of Logistics (SOLE). It promotes professional development and advances in logistics through examination and discussion of the latest technology, techniques and professional issues in the field. Its objectives are to provide logistics professionals with thought-provoking insights into current logistics management developments; contribute to the

professional and educational development of logisticians and to provide information of special interest to them; encourage scientific, educational and literary endeavors to further the development of logistics technology, education and management; and exchange information among researchers and practitioners about logistics management practices and circulate these ideas to the entire logistics community.

In 1996, Focused Logistics was introduced as part of the Chairman of the Joint Chiefs of Staff's (CJCS) Joint Vision 2010. It was discussed in articles in *Army Logistician* in 1997, 1999 and 2003 and the *Logistics Spectrum* in 2002 and 2004. A summary of the articles follows. In 1996, the CJCS and the J-4 established the Focused Logistics Action Plan to implement Joint Vision 2010. In 1999, the J-4 identified five imperatives of Focused Logistics: Joint Theater Logistics Management, Joint Deployment-Rapid Distribution, Information Fusion, Multifunctional Logistics, Force Medical Protection, and Agile Infrastructure. By 2003, Joint Vision 2010 had become Joint Vision 2020, and the J-4 had replaced the Focused Logistics Action Plan with a Campaign Plan that identified Future Logistics Enterprise as the goal for 2005 to 2010 and Focused Logistics as the goal for 2020. The Army's JV2020 describes the essence of Focused Logistics: a seamless logistics system, distribution-based logistics, total asset visibility, an agile infrastructure, rapid force projection, and maintenance of an adequate logistics footprint. Today, Focused Logistics has nine characteristics: fully integrated, expeditionary, networked, decentralized, and adaptable, having decision superiority, effective, reliable, and affordable.

Like the RML, Focused Logistics has been the subject of numerous research papers by Army logisticians. To name a few: *Logistics: JV 210, Focused Logistics* by

LTC Kenneth Dowd (1999); *The Road to Focused Logistics* by LTC Aaron Harvey (2001); and *The Glide Path to Focused Logistics* by Robert Gosciewski (2004); all published by the United States Army War College.

LTC Dowd concludes that in order to meet the goals of Focused Logistics, we must divest ourselves of stovepipe operations and embrace the idea of being purple--this is a given with Focused Logistics. He identifies three specific areas on which to focus. First is the development of a Joint Theater Support Command, with a single logistics operator (commander vice staff officer). In the past, the senior joint logistician has been a staff officer working with service specific logistics commanders. Second is the need to acquire and implement logistics enablers with the same fervor as maneuver enablers. Additionally, the process for getting these technologies into trained soldiers' hands must be streamlined and force structure changes must match technology implementation. Third, we must train jointly. Although this is currently done as part of the Joint Professional Military Education (JPME), it does not begin (for the Army) until the Intermediate Level Education (ILE) and then, it is barely joint.

LTC Harvey, like LTC McCagnan (*Logistics Transformation: Restarting a Stalled Process*), believes that the road to focused logistics has been blocked by the very group of individuals attempting to implement it. He examines the following areas in detail: the RML, battlefield distribution, velocity management, and total asset visibility. He concludes that through a combination of implementation without a clear objective and strategy, the Army has reached its current state of “transformation” by accident. However, he believes, now that the Army is where it is--the Army must focus on a specific end state and combine current and future capabilities to reach it.

Robert Gosciewski examines the six tenets of Focused Logistics described in JV 2020. He linked those tenets to the four focus areas described by the Army G-4 in a white paper published in the *Army Logistician* in 2004 (discussed in the RML section). In linking the six tenets and four focus areas together, Mr. Gosciewski identified one technology above all others that must be implemented. That is the technology that enables communication between all services and components (combat arms, combat support, and combat service support). He states that Focused Logistics is a timely distribution-based system built on logistical awareness of the situation and real-time information exchange. However, we are still building systems that do not communicate with each other. We must dedicate the resources to seamlessly move electrons between C2 systems, maneuver information systems, and logistics supporting information systems. Seamless logistics support requires an accurate and timely common operating picture of the joint operational and logistics environment. Assured communications support is a necessary requirement for success. Without this data connectivity, future force commanders will be able neither to build nor to sustain combat power.

Commercial Practices

As stated previously, part of the genesis behind the RML, when it was first introduced in 1999 was the adoption of commercial business practices. Therefore, an analysis of the RML and its place in the RMA would be incomplete without a look at current commercial practices and their possible application in the ongoing logistics transformation. For the purposes of this thesis, the author has chosen the following companies for analysis: Federal Express (FEDEX), Wal Mart, and John Deere.

The first publication is *FEDEX Delivers*, by Madan Birla, published in 2005. Birla, who spent 22 years with FEDEX, looks at leadership practices that allowed the company to outperform its competition. Using interviews with FEDEX executives, including CEO Frederick Smith, Birla focuses on how the company tapped into the creativity and commitment of its employees. The author breaks innovation down to three steps--generation, acceptance, and implementation. The book focuses less on the mechanics of running a distribution based company than on the principles of leadership, yet provides some foundations for innovative thinking about the RML.

The second publication is *The John Deere Way: Performance that Endures* by David Magee, published in 2005. John Deere is unique in that its success is based on providing superior quality products rather than outsourcing to foreign manufacturers. This is in large part due to its customer base--largely a rural, no-nonsense population. The books lists five principles that have made the company successful: Embrace the Culture, Quality Comes First, Always Maintain Integrity, Build a Business as Great as Your Products, and Grow on the Strength of Your Roots. Although John Deere is not a distribution-based company, it is worth studying in that it has grown enormously over 150 years of business. One of the shortfalls of this book (and all in general) is that it requires the cooperation of leadership within John Deere in order to gain any real insight and that comes with a price--generally writing laudatory comments about the company in question.

The third book is *The World on Time: The 11 Management Principles That Made FEDEX an Overnight Sensation* by James C. Wetherbe, published in 1996. Wetherbe, a Federal Express Professor of Excellence at the University of Memphis, writes about how

in starting the company, its founder and CEO created the next-day package delivery industry. He describes the 11 abiding principles that guide the company. Again, this is a study in leadership and management principles rather than a dissection of how the company operates its hub-and-spoke distribution model. However, the relevance of this work is that FEDEX's distribution model is no secret anymore and if FEDEX is to survive, than it must evolve, much like the military in its current state. An insight into FEDEX's guiding principles may help the Army shape its further transformation.

Customer Culture: How FEDEX and Other Great Companies Put the Customer First Every Day by Michael D. Basch, published in 2003 is the fourth publication. Basch was a member of FEDEX's team that implemented dedication to customer service that revolutionized its transportation practices. Basch redefines the acronym CEO into the following--Customers, Employees, and Owners. Again, this is more of a human resources book than a systems engineering study.

The final publication is *The Wal-Mart Effect: How the World's Most Powerful Company Really Works--and How It's Transforming the American Economy* by Charles Fishman, published in 2006. Fishman describes Wal-Mart's price-cutting, hard-nosed ethos and how it mirrors the transformation of the American economy over the past 20 years. He presents the benefits of Wal-Mart's growth in the context of globalization, but also presents the case against Wal-Mart's penny-pinching mind-set. Again, Fishman focuses little on Wal-Mart's famous "just-in-time" logistics model--as it appears that cheap, foreign suppliers contribute to Wal-Mart's success just as much as their distribution system. He does, however, delve into their predictive analysis of consumer

demands and their ability to offer the same product (such as groceries) at prices almost 15 percent less than that of its competitors.

Revolution in Military Affairs

Finally, let us examine the credentials of the two authors from whom we draw our primary research question. It is apparent that both are experts in their field and thus their definition can be taken as reasonable for an RMA. Both gentlemen are cited during numerous classes taught by the Department of Military History at the United States Army Command and General Staff College.

Williamson Murray graduated from Yale University in 1963 with honors in history. After serving for five years in the United States Air Force, he returned to Yale where he received his Ph.D. in military-diplomatic history. He taught at Yale for two years in the history department before moving on to Ohio State University in 1977 as a military and diplomatic historian. He received the Alumni Distinguished Teaching Award in 1987 and retired in 1995 as Professor Emeritus of History.

Murray has taught at the Air War College, the United States Military Academy, and the Naval War College. He has served as a Secretary of the Navy Fellow at the Navy War College, the Centennial Visiting Professor at the London School of Economics, the Matthew C. Horner Professor of Military Theory at the Marine Corps University, the Charles Lindbergh Chair at the Smithsonian's Air and Space Museum, and the Harold K. Johnson Professor of Military History at the Army War College. He is currently a Senior Fellow at the Institute of Defense Analysis and a member of the National Strategic Studies Group.

Murray has written a wide selection of articles and books including *Military Innovations in the Interwar Period* (Cambridge 1996) and *The Dynamics of Military Revolution, 1300-2050* (Cambridge, University Press 2001). Murray's most recent book, *The Iraq War, A Military History* (Harvard University Press 2003) was written with Major General Robert Scales Jr.

MacGregor Knox holds the Stevenson Chair in International History at the London School of Economics. Knox received a B.A. from Harvard College, and an M.Phil. and Ph.D. from Yale University. He taught at the University of Rochester before joining the London School of Economics in 1994.

CHAPTER 3

RESEARCH METHODOLOGY

The purpose of this chapter was to outline the research methodology used to answer the primary research question as well as the secondary questions. The types of research used to gather data fell into two categories; periodical, research paper and book research that generally produced an opinion or analysis about a subject, and organizational structure and doctrine of the military that produced supporting facts to an argument.

The following paragraphs described the methodology the author intended to use to answer the secondary questions of this thesis. By answering these questions the author was able to answer the primary question of this thesis.

Research Question and Subordinate Questions

The principle question of this research is: Whether the Army's Revolution in Military Logistics is truly a Revolution in Military Affairs as defined by MacGregor Knox and Williamson Murray in their book, *Dynamics of Military Revolution*. In order to adequately answer this question, several other issues will need to be addressed:

1. Based on publications between 1999 and 2004, what are the tenets of the RML?
2. What specific changes has the Army made to its doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF) of logistics units to achieve its desired end state in the determined tenets?
3. How do those changes compare fundamentally with the DOMLPF of logistics units since the last RMA?

The answer to these questions is best accomplished by conducting qualitative analysis on two sets of literature: first, the Army's published objectives for its "Revolution in Military Logistics" (RML), and second, the Army's doctrinal publications. The first set of literature provides a roadmap for how the Army intends to execute its revolution. The second set of literature provides concrete examples of how the Army already has or intends to change the DOTMLPF of its logistics. By comparing the results of the analysis of changes in doctrinal publications from 1999 to present and applying them against results of analysis of the Army's published objectives for its RML, the author will determine if the Army has met or will meet the goals established by senior Army leadership. By comparing the analysis of doctrinal publications and applying it to Knox and Murray's and the OSD's Office of Net Assessment's definitions of RMAs, the author will determine if the changes made are revolutionary in nature and meet the criteria for an RMA. Finally, the author will analyze published research papers by civilian and military logisticians that address the RML and studies of commercial logistics practices to determine recommended changes to the Army's current transformation strategy. In order to answer the primary research question, the author must use some subjective analysis. Based on the author's qualifications, which follow, this is a logical approach.

As a professional military logistian for the past twelve years and having served at the tactical level, the author has observed many of the initiatives due to the Revolution in Logistics. During deployments in support of *Operation Joint Guardian* and *OIF*, the author has been responsible for all materiel for a mechanized Brigade Combat Team and mechanized Division, conducting offensive, stability, and support operations. During

those operations, the author experienced challenges in supporting the force that could not be addressed by current doctrine or even tactics, techniques, and procedures.

Investigatory Steps

The methodology used in answering the primary research questions involved 5 steps:

1. Determine the goals of the Revolution in Military Logistics. As discussed in chapter 2, the Revolution in Military Logistics was first introduced to the military through a “spotlight” issue of *Army Logistician* in 1999. Since that time, there have been numerous power point presentations, command briefs, white papers, articles, and official publications that address focus areas for the RML, also titled logistics transformation. An in depth study of all available documents during the last seven years is the basis of this research. Once all documents are reviewed, the author will compare similarities, contrast differences, and ultimately identify inconsistencies. Once completed, the author will be able to make a subjective analysis and determine the Army’s true goals for its RML for the purposes of this thesis.

2. Identify changes made to the DOTMLPF of tactical logistics units. The primary sources of data for identifying changes made were Army field manuals and tables of organization and equipment--their publication represents codification. As Army doctrine is directive in nature, it requires in depth study and a methodological approach to research in order to establish a baseline of how Army logistics is supposed to operate and if units charged with that mission have the required resources to do so. Comparison of doctrinal publications that pre date the RML and current doctrinal publications results in the determination of changes made. As all doctrinal publications are not written in the

same format, again, subjective qualitative analysis will have to be conducted by the author.

3. Determine whether changes made are revolutionary. In terms of analyzing qualitative information concerning the quality of changes made in logistics operations, a required to look for relationships between these concepts and categories, by constantly comparing them, as names and their genesis may have changed in the last seven years. An analysis of DOTMLPF characteristics of logistics organizations allowed the author to compare and contrast the pre and post RML logistics construct. Results of the analysis appear in chapter 4.

4. Determine the Army's success in implementing changes. The synopsis of literature in chapter 2 accomplished the first step of the methodology by describing the publications that address tenets, areas of focus, and current status of the logistics transformation initiatives. Once the current goals of the RML have been established, in Step One and a descriptive analysis of the changes made to the DOTMLPF aspects of logistics organizations have been made, in Step Two, this step can be completed. Changes made as a result of the RML will be compared to the definitions of the goals-tenets-focus areas of the RML. As apparent, the research design focused heavily on logistics during combat operations. Combat operations provided a great opportunity to assess logistics initiatives and a means to identify logistics shortcomings.

5. Make a Recommendation. The author assembled and analyzed various amounts of qualitative information on lessons learned from military operations, Force XXI Logistics Redesign, The Revolution in Military Logistics, Focused Logistics, commercial business practices, the Revolution in Military Affairs, and emerging logistics enablers.

Based on this research and the author's personal qualifications, and the definition of the Revolution in Military Affairs, the author will make recommendations on how to revolutionize military logistics and overcome identified logistics shortfalls that have not yet been addressed.

Conclusion

This chapter proposed the typology and methodology for this study and included general design, instrumentation, validation, and data analysis. The general designs of the study focus on literature review with an application of experience. The selected literature is concerned with reviewing the chronology of the RML to date, the doctrinal changes in logistics and their corresponding implications on the RML, the assessment of the current state of the RML, and finally, historic and commercial case studies against which to apply the results of the research and make recommendations.

CHAPTER 4

ANALYSIS

Goals of the Revolution in Military Logistics

To understand United States Army logistics transformation to date, it is first necessary to examine its stated goals between 1999 and today--its developmental path to date. Concurrently, we must examine its ties to joint doctrine. This will answer the research question: based on publications between 1999 and 2004, what are the tenets of the RML?

In 1996, the Chairman of the Joint Chiefs of Staff (CJCS) published *Joint Vision 2010 (JV 2010)*, outlining his thoughts on how the U.S. military needed to prepare to meet challenges and adversaries in 2010. *JV 2010* named key tenets required to achieve a level of full spectrum dominance over adversaries--one of which was Focused Logistics. The Chief of Staff of the Army (CSA) published the corresponding *Army Vision 2010* in 1997 (Macagnan 2005, 4). *AV 2010* defined Focused Logistics as “the fusion of information, logistics, and transportation technologies to provide rapid crisis response, to track and shift assets even while en route, and to deliver tailored logistics packages and sustainment directly at the strategic, operational, and tactical level of operations.” At that time the Army listed eight concepts that it would pursue in the development of Focused Logistics: Anticipatory Logistics & Personnel Support; Split-based Operations; Sustained Tempo; Enhanced Throughput Operations; Velocity Management; Battlefield Distribution System; Total Asset Visibility; and Objective Supply Capability (Reimer 1999, 2).

In 1997, the Joint Staff Logistics Directorate (J4) published *Focused Logistics, the Joint Logistics Roadmap to Joint Vision 2010* as an addendum to JV 2010. This was an action plan for the identification and integration of joint logistics issues and initiatives (Maccagnan 2005, 5). A key to this plan was the identification of six tenets, or areas of focus, designated as the framework for the logistics template required to support joint warfighting: Joint Theater Logistics Command and Control; Joint Deployment and Rapid Distribution; Information Fusion; Multinational Logistics; Joint Health Services Support; and Agile Infrastructure (Shalikashvili et al. 1997, vi--vii). While concepts such as technological innovation and leveraging key enablers to achieve information superiority were referred to as something desired--the lack of specifics meant this document served as a general direction of effort rather than a series of steps to be followed to achieve the end state described (Maccagnan 2005, 5).

In 1999, The Army Deputy Chief of Staff for Logistics (Army G-4), the CASCOM Commander, and the Commander of Army Materiel Command (AMC) collaborated on the aforementioned article for *Army Logistician* magazine that clearly laid out the way ahead for logistics transformation. For the first time, the Army's three senior logisticians addressed the logistics community in a unified voice and a force-wide manner. The CSA and the Commander of the Defense Logistics Agency (DLA) wrote complimentary articles in the same issue of the magazine (Maccagnan 2005, 5).

These articles identified the Army's focus areas for the next 10 years of transformation; designated as the first wave of the stated revolution in military logistics. The Army's logistics transformation would focus on exploiting improvements in automation, communications, and business practices, reshaping command and control

relationships to provide better unity of command, and purchasing distribution technologies that facilitated rapid throughput and follow on sustainment. The second wave of logistics transformation, from 2010 and beyond, would focus on maximizing emerging technologies that could be utilized to lighten support requirements, to enable them to be projected faster, and to reduce the overall demand for logistics as a whole (Maccagnan 2005, 5). The Army also named its tenets needed to frame the efforts in the achievement of Focused Logistics: a seamless logistics system; distribution based logistics; total asset visibility; agile infrastructure; rapid force projection; and maintaining an adequate logistics footprint (O'Konski 1999, 10-14).

As will be discussed at the end of this section, the Army did not completely mirror the concept of Focused Logistics as defined by the six tenets; neglecting to include Joint Theater Logistics Command and Control, Multinational Logistics, and Joint Health Services Support. This is significant as it reveals that the alignment of priorities at the Army and joint level were not always synchronized (Maccagnan 2005, 6).

In 1999, the CSA changed the direction of Army transformation--significantly impacting the RML. With the introduction of the Stryker Brigade, the Army's focus became the development of a force that had the qualities of both heavy and light forces and on a force to follow the interim one that had a yet to be defined organizational construct named the Objective Force. The success of the Stryker Brigade was measured in speed and weight--it had to deploy more rapidly and it had to have a much reduced logistics footprint. Concurrently, but not in coordination, the CJCS published an update to *Joint Vision 2010* entitled *Joint Vision 2020*. Although none of the tenets of either

Army or joint logistics transformation changed, their application to the logistics construct did (Maccagnan 2005, 6).

The Army made an adjustment to the logistics transformation with the introduction of the Stryker Brigade. The goal was now to sharply reduce the logistics footprint in a theater of operations--allowing more rapid deployment by requiring fewer units to be projected. This small logistics footprint was going to be enabled by a concept called “reach back” logistics or “Combat Service Support (CSS) reach.” This term and its concept mirror that of velocity management or just-in-time logistics discussed in chapter 1. Some researchers have posited that this term is actually not a new concept--but rather a synthesis of several existing and emerging logistics transformation initiatives such as split-based operations, velocity management, information superiority, and distribution management (Maccagnan 2006, 6-7).

In the aftermath of 9/11 and the commencement of the Global War on Terrorism, it is reasonable to assume that joint, Army, and logistics transformation--as previously defined--changed. In 2002, the J-4 published a revised *Focused Logistics Campaign Plan*; an update of the previous Joint campaign plan designed to correspond with *JV 2020*. The plan redefines Focused Logistics as, “..doing logistics right . . . getting the right personnel, equipment, supplies, and support in the right place, at the right time and in the right quantities across the full spectrum of military operations.” This document also introduced two new initiatives, entitled “Logistics Transformation” and “Future Logistics Enterprise,” designed to establish a more robust foundation for achieving Focused Logistics. Logistics Transformation aimed at improving real-time logistics situational awareness by optimizing business practices, developing a data system that provides

interoperable and actionable logistics information, and enhancing responsiveness of support operations to the warfighter and was defined by four concepts: Customer Wait Time, Time Definite Delivery, Total Asset Visibility, and a Web-based, Shared-data Environment (Holder 2003, 4).

Future Logistics Enterprise was described as a “... mid-term vision (2005-10) to accelerate logistics improvement, enhance support to the warfighter, and align logistics processes with the operational demands of the 21st century.” This initiative specified the direction that Joint logistics would explore in the future and again was defined by concepts: Total Life Cycle System Management, Condition Based Maintenance, Depot Maintenance Partnerships, End to End Distribution, Executive Agents, and Enterprise Integration (Paulus 2004, 6).

The Army did not publish a corresponding document, waiting until January 2004 to publish the *U.S. Army Transformation Roadmap*. This document describes how the Army sees Focused Logistics contributing in the context of current Joint Operating Concepts. It again is defined by four tenets: Logistics Data Network; Responsive Distribution System; Robust, Modular Force Reception Capability; and an Integrated Supply Chain (Schoomkaer 2004, 5-10--5-11). It is difficult to trace any linkages between this document and the *Focused Logistics Campaign Plan* from 2002, however, this is understandable with the commencement of Operation Iraqi Freedom in 2003. Some have posited that the *U.S. Army Transformation Roadmap*, coupled with the ARFORGEN model for manning the Army is an answer to the increased Army’s current increased OPTEMPO.

Finally, in March 2004, the U.S. Army Deputy Chief of Staff, G-4 published his Army Logistics White Paper in *Defense AT&L* magazine. With the benefit of hindsight from OIF and OEF, LTG Christianson defines four focus areas that the Army will hold preeminent over the next two years. They are: Connect Army Logisticians, Modernize Theater Distribution, Improve Force Reception, and Integrate the Supply Chain (Army Logistics White Paper). Not surprisingly, the two publications in 2004 practically mirror each other.

This summarizes where logistics transformation has been and where it stands now--in terms of concepts, the Army, joint, and DoD visions of what transformation means. While the focus on logistics transformation over this chronology may seem impressive, it is necessary to ask, after nearly a decade of transforming, what the focus is, what the product is so far, and what the report card should say.

To sum up what has been discussed, table 1 is a chronological order of the Army's published tenets or focus areas of logistics transformation-the revolution in military logistics and their links to joint doctrine.

To determine what the focus areas for the Army's revolution in military logistics really are, we must assume first that the most recently published goals are still current. If that is the case, then the two documents that were published in 2004 and their four focus areas are the baseline for what the author believes are the Army's true goals. Below are definitions of the four focus areas according to the *U.S. Army Transformation Roadmap*. The Logistics White Paper, published by the Army G-4 paraphrases this document in the definition of its focus areas.

Table 1. 1996-2004 Published Tenets and Focus Areas of Logistics	
1996--1997	
Army Vision 2010	Joint Vision 2010
Anticipatory Logistics & Personnel Support	Joint Theater Logistics C2
Split-based Operations	Joint Deployment and Rapid Distro
Sustained Tempo	Information Fusion
Enhanced Throughput Operations	Multinational Logistics
Velocity Management	Joint Health Services Support
Battlefield Distribution System	Agile Infrastructure
Total Asset Visibility	
Objective Supply Capability	
1999--2002	
Revolution in Military Logistics	Joint Vision 2020
Seamless Logistics System	Customer Wait Time
Distribution Based Logistics	Time Definite Delivery
Total Asset Visibility	Total Asset Visibility
Agile Infrastructure	Web-based, Shared-data Environment
Rapid Force Projection	Total Life Cycle System Mgmt
Maintaining an Adequate Logistics Footprint	Condition Based Maintenance
	Depot Maintenance Partnerships
	End to End Distribution
	Executive Agents
	Enterprise Integration
2004	
U.S. Army Transformation Roadmap	Army Logistics White Paper
Logistics Data Network	Connect Army Logisticians
Responsive Distribution System	Modernize Theater Distribution
Robust, Modular Force Reception Capability	Improve Force Reception
Integrated Supply Chain	Integrate the Supply Chain

Source: All of the above referenced sources have been complied to create this table.

Logistics Data Network--Army logisticians will be an integral part of the joint battlefield communications network, with satellite-based communications that provide full-time connectivity on demand, enabling logisticians to pass and receive key data from the battlefield to the industrial base. These capabilities will allow joint force commanders to make decisions based upon accurate, real-time logistics information (Army Logistics White Paper).

Responsive Distribution System--The Army, together with the U.S. Transportation Command, will develop a distribution-based logistics system focused on guaranteeing on-time delivery. The distribution system must reach from the source of support to the Soldier in the front lines. Achieving this standard strengthens war fighter confidence by increasing visibility and establishing flexible, responsive distribution capabilities. Forward storage of large quantities of supplies is no longer necessary (Army Logistics White Paper).

Robust, Modular Force Reception Capability--To receive joint and expeditionary force flow and to facilitate immediate operational employment and sustainment, the Army will design an integrated theater opening capability that responds on extremely short notice and executes crucial sustainment tasks immediately upon arrival in theater (Army Logistics White Paper).

Integrated Supply Chain--The Army will develop an end-to-end enterprise view of the supply chain and a service and agencies integration of processes, information and responsibilities. The Army will closely coordinate and align with the Defense Department's focused logistics initiative. The goal is to provide joint logistics data freely and automatically between strategic, operational and tactical level headquarters and agencies (Army Logistics White Paper).

Next, we must look at the Army's first attempt at formalizing logistics transformation with *Army Vision 2010*. None of the eight tenets described in that document were defined. That text was tied to *Joint Vision 2010*, a document superceded by *Joint Vision 2020* five years later. As five of those original eight tenets appear either verbatim, in a restated form, or as a subset of a tenet in *Army Logistician* in 1999, it is

safe to assume that Army leaders analyzed AV 2010 prior to publishing the six tenets of the RML. Those tenets that did not make the cut were either achieved or no longer relevant.

So let us compare the current four focus areas to the six tenets of the Revolution in Military Logistics. Mark O'Konski described the first tenet, Seamless Logistics System in the same issue of *Army Logistician*.

Seamless Logistics System – This interconnectivity and interoperability extends well beyond the Army-owned tactical and administrative portions of the information chain. By necessity, it encompasses joint, combined, and commercial systems. On the military side, the seamless logistics system ... interface(s) with command and control systems, but it also must connect with digitized weapon systems so it can pull in and use the data available from those systems' sensors and onboard prognostics. It must reach in lateral and rear directions to interface seamlessly with the logistics and financial systems of the other services and the Defense agencies. Finally, it must connect to the global network of electronic commerce; this will enable industry partners to track and support Army forces in the field, and it will allow Army logisticians to locate suppliers expeditiously and do business with them. The key processes of the seamless logistics system are: readiness management, logistics interventions, distribution management, and asset management. (O'Konski 1999, 11)

This appears to be a much more thorough definition of the *Integrated Supply Chain* mentioned in the *U.S. Army Transformation Roadmap*. Therefore, we will assume that the concept has been renamed and carried over to the present day. The second tenet, *Distribution Based Logistics (DBL)*, is named specifically in the definition of *Responsive Distribution System* and seems to be a subset. In fact, that focus area seems to combine DBL with some aspects of the next tenet from 1999--*Agile Infrastructure*. However, the complete definition of *Agile Infrastructure* is not covered under *Responsive Distribution System* and therefore merits some examination.

Agile Infrastructure--includes four subsets.

Structural agility refers to total integration of all Army components, as well as incorporation of support teams from other services, allies, and the Army's partners in industry for specific missions. Teaming and task organizing are key RMA skills that apply especially to RML support forces. Logistics task forces need to be able to scale up and down in size, as well as in technical expertise. Personnel, teams, and units from all components need to be capable of deploying and moving independently to an in-theater rendezvous location. Active and reserve component units must be ready to accept, employ, and in some cases support Department of the Army (DA) and Department of Defense (DOD) civilian augmentation, as well as contractor personnel and equipment. All must be prepared to integrate with allied and host nation support organizations. (O'Konski 1999, 12)

Physical agility refers to the need to deploy and maneuver the operational infrastructure of the distribution-based logistics system. Distribution-based logistics depends on an integrated, intermodal network of information systems, distribution platforms, and automated materials-handling equipment. To keep pace with fast-moving Army XXI forces, and to stay one jump ahead of an opponent's long-range weapons, the logistics units and personnel operating this network must be able to maneuver the component systems and control the movement of the distribution platforms on the fly. And they must be able to do so without degrading the throughput of sustainment to the fighting forces. (O'Konski, 1999, 12)

Acquisition agility is a key Army goal in RML. In order to keep pace with the fast-changing demands of RMA warfare and RML support, the acquisition system must support rapid and flexible access to a wide range of commercial sources of supply. The agile acquisition system also will be crucial to designing, building, and fielding the advanced systems and modernization packages that will make Army XXI and the Army After Next a reality. Reduced development cycles will provide state-of-the-art technology to our forces in the field at a price the Nation will be willing to pay--if we are agile enough to exploit it. (O'Konski 1999, 12)

Mental agility refers to attitude. RML logistics is fast logistics. All logistics managers in the supply chain need to think several steps ahead, all of the time. Real-time, 24-hours-a-day, 7-days-a-week operations will be the norm. Organizations need to staff for this tempo and train team members to work in such a fast-paced environment. Additionally, many of the initiatives in the Revolution in Business Affairs that streamline and improve logistics, acquisition, and financial processes contribute to this new, heightened agility (O'Konski 1999, 12--13).

In essence, *Agile Infrastructure* refers to the following: the transformation of the United States Army to modular organizations, the ability to be mobile on the modern battlefield, and the ability to rapidly acquire materiel. As none of these aspects are addressed specifically in the current focus areas, *Agile Infrastructure* merits its own focus area. The next tenet of the RML, *Total Asset Visibility*, has been on the Army's "to do" list since 1996 and is part of *JV 2020*. Although it is now a subset of a *Responsive Distribution System*, it must be a specific, named subset, so it does not become lost in further change. The next tenet, *Rapid Force Projection*, lives in the present as the focus area *Robust, Modular Force Reception Capability*. The one aspect not covered in the transition from a tenet in 1999 to a focus area in 2004 is the ability to sustain forces once deployed--this is covered under the focus area, *Responsive Distribution System*.

The final tenet, *Adequate Logistics Footprint*, addresses risk associated with distribution based logistics and some of the lessons learned from recent military operations.

Adequate Logistics Footprint – Maintaining an adequate logistics footprint involves a number of things. One is presence in the theater of operations. Operational logistics infrastructure also takes on a new dimension in the RML. As envisioned in the Army After Next operations support command (OPSCOM), the RML logistics support for an engaged CINC will be operationally, not geographically, focused. This means that the CINC's logistician--the OPSCOM commander--will command and direct forces, units, agency offices, and contractor operations on a global basis, all focused on the CINC's operations. This will give the CINC and his OPSCOM commander great flexibility in moving work to workers and workers to work. However, care must be taken in sizing future logistics organizations so that when missions are moved to allow a reduction at one level of command, they are not given to organizations whose capabilities have been reduced under previous mission transfers. (O'Konski 1999, 14)

Based on the observations that not maintaining an adequate logistics footprint has contributed to challenges in the past, and is not addressed specifically in any of the four

focus areas, it makes the cut as one of the focus areas against which the author will report on the Army's progress.

Finally, we discuss the joint and DoD initiatives that, as previously identified, have not been incorporated into RML focus areas? The first three, *Joint Theater Logistics Command and Control*, *Multinational Logistics*, and *Joint Health Services Support*, were covered by *JV 2010*, but failed to be covered by *Army Vision 2010*. Rather than addressing each of these individually, we will look at the Army' attempt to incorporate *Joint and Multinational Support* into its logistics changes with emphasis on C2 and Health Service Support. The next tenets not easily identified as having been covered by Army tenets from *JV 2020* are: *Total Life Cycle System Management*, *Condition Based Maintenance*, *Depot Maintenance Partnerships*, and *Executive Agents*. *Total Life Cycle System Management*, *Condition Based Maintenance*, and *Depot Maintenance Partnerships* in reality all deal with the Army's ability to sense a failure or impending failure in its maintenance systems and respond accordingly, all the way to the national level. Therefore, they will be categorized under the DoD initiative, *Sense and Respond Logistics*. *Sense and Respond Logistics* as defined previously is really just an aspect of the *Responsive Distribution System* and will therefore fall under that tenet.

So here is what the author has determined the Army's focus areas for logistics to be:

1. Logistics Data Network
2. Responsive Distribution System
3. Robust, Modular Force Reception Capability
4. Integrated Supply Chan

5. Agile Infrastructure
6. Adequate Logistics Footprint
7. Joint and Multinational Logistics

At the conclusion of this paper, the author will use these seven tenets to determine whether the Army is achieving revolutionary changes to its logistics structure.

Now that the author has determined the “goals” of the RML, what specific changes has the Army made to its doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF) of logistics units to achieve its desired end state in those seven goals?

Doctrine

Combat Service Support--General

In order to study doctrine, the first documents that must be compared and contrasted are the Army field manuals on CSS. The last manual published prior to the RML was FM 100-10, *Combat Service Support*, dated October 1995. The current manual is FM 4-0, *Combat Service Support*, dated August 2003. First, the fact that the publication has been renumbered 4-0 represents a significant change. In 2001, the Army adopted the joint publication numbering system for its Field Manual series. FM 4-0 corresponds with Joint Publication 4-0, *Doctrine for Logistic Support of Joint Operations*, and represents an attempt by the Army to integrate into the joint community.

FM 100-10 defines Combat Service Support using the joint definition from Joint Pub 1-02 as:

The essential capabilities, functions, activities, and tasks necessary to sustain all elements of operating forces in theater at all levels of war. Within the national and theater logistics systems, it includes but is not limited to that support rendered by

service forces in ensuring the aspects of supply, maintenance, transportation, health services, and other services required by aviation and ground combat troops to permit those units to accomplish their missions in combat. Combat service support encompasses those activities at all levels of war that produce sustainment to all operating forces on the battlefield. (1995, iv)

It goes on to explain how the Army has become a force projection rather than forward deployed force in light of the end of the cold war. It states that military operations other than war will consume much of the Army's resources and that the Army must remain able to accomplish its traditional mission of prosecuting land warfare as part of a joint team and multinational force. The Army will be largely CONUS-based and must be able to operate around the globe, often on short notice. Supporting that Army requires support personnel to take advantage of current and developing technologies.

FM 100-10 next describes the five characteristics of CSS: anticipation, integration, continuity, responsiveness, and integration. Below is a brief definition of each from FM 100-10.

Anticipation (is) the ability to foresee future operations and to identify, accumulate, and maintain the assets, capabilities, and information required to support them. At the strategic level, anticipation ensures that CSS capabilities are versatile and mobile enough to accommodate potential operational and tactical events. Maintaining an industrial base is fundamental to anticipation. At operational and tactical levels, CSS leaders and staffs anticipate future events and requirements by understanding the commander's intent and by foreseeing events as operations develop.

Integration has two aspects. One is the integration of the CSS and operational efforts. The other is the integration of Army CSS with the support operations of other services, nations, and agencies. At the national and theater strategic levels, they are inseparable as planners and combatant commanders ensure that deployable and sustainable Army capabilities are available. At the operational and tactical levels, support planners and operators must understand the commander's intent and work closely with operations planners. Army forces frequently operate in unified actions as part of a joint, multinational, and interagency team.

Responsiveness is the ability to meet changing requirements on short notice. At the national level, we live in a dynamic global society that places shifting

demands on our military. At the operational and tactical levels, operations often evolve in unexpected directions as commanders constantly seek to exploit fleeting opportunities. Support personnel at all levels must be ready to rapidly tailor available capabilities to meet changing priorities and types and quantities of support requirements. This requires visibility of all available resources and flexible CSS organizations that leaders can quickly restructure to efficiently satisfy the new demands on the system.

Improvisation is often necessary to provide continuous and responsive support. CSS personnel try to anticipate all support requirements and build a CSS structure capable of responding to any eventuality. However, it is inevitable that situations will arise in which even tailored resources will not be available to meet requirements if leaders apply them as outlined in doctrine or support plans. Therefore, support personnel must be prepared to seek innovative solutions to problems. If established support procedures are not providing the support required by the force, CSS personnel must be willing and capable of rapidly devising new ones that meet the needs. If required assets are not available through the normal system, they must be creative in acquiring them. Extraordinary means may be necessary to get things done. This is especially true at the tactical level where short time frames often require greater use of improvisation. (1995, 1-4 and 1-5)

Continuity involves providing for multiple sources and means of support. At the strategic level, it may mean setting priorities and arranging for more than one source of supply. Operational planners consider factors such as multiple lines of communication (LOCs), ports, and modes, and cross-leveling of theater assets. At the tactical level, continuity may involve such considerations as security of support areas and echeloning the functional capabilities of a support organization (FM 100-10 1995, 1-4).

Finally, it lays out the six tactical functions of CSS, and through annexes, lists the six CSS functions. The six tactical functions are arming, fueling, fixing, moving, manning, and sustaining. All of these functions are self-explanatory except manning and sustaining--which will be defined by FM 100-10 as follows.

1. Arming
3. Fueling
4. Fixing

5. Moving

6. Manning – the force involves the personnel support activities which ensure the commander has the personnel required to accomplish his mission. It involves management of personnel readiness, replacements, and casualties. Managers must take into account civilian personnel as well as soldiers. Also, the manning systems must be able to interface with joint and multinational systems. Personnel managers coordinate with materiel and movement managers, and with the medical and mortuary affairs systems to ensure the right people are where they need to be at the right time. (FM 100-10 1995, 1-14)

7. Sustaining Soldiers and Their Systems – involves provision of a wide range of services and supplies. It is associated with all the services which directly ease Soldiers' personal concerns. These include personnel service, combat health, field service, and general supply support. (FM 100-10 1995, 1-15)

a. Personnel service support (PSS) enhances soldier performance by providing services which enhance his morale and sense that he is being cared for. It also includes support to promote efficient management of funds. Specific functions include personnel services, religious support, legal service support, finance services, and resource management (FM 100-10 1995, 1-15).

b. Combat health support provides a continuum of health care from all locations throughout a theater to the CONUS base. It provides state-of-the-art medical evacuation, treatment, and preventive care (FM 100-10 1995, 1-15).

c. Field service support consists of a variety of capabilities designed to provide essential services and enhance a soldier's quality of life during operations. It includes food preparation, water purification, mortuary affairs support, airdrop support, laundry and shower services, and clothing and light textile repair (FM 100-10 1995, 1-15).

d. General supply support refers to supply of subsistence, clothing, water, barrier material, and major end items (FM 100-10 1995, 1-15).

Although not called such, the following are the six CSS functions: Supply, Transportation, Maintenance, Combat Health Support, Personnel Support, and Field Services (FM 100-10 1995, A-1--F-1).

The first significant change between FM 100-10 and FM 4-0 is that 4-0 ties CSS directly to the Army's Mission Essential Task List (METL). The Army METL and its corresponding CSS aspects are:

Respond Promptly to Crisis: CSS is an integral part of the Army's rapid response. A distribution-based CSS system gives commanders increased management control and visibility of supplies, equipment, and personnel moving to and within the theater. The modular design of CSS organizations and their capability to conduct split-based operations give the force commander flexibility in tailoring CSS to meet the immediate need while minimizing lift requirements and the CSS footprint. Additionally, other CSS reach operations enhance responsiveness by using intheater resources, such as host-nation support (HNS) and theater support contractors, to provide or augment services for deployed forces. (FM 4-0 2003, 1-2)

Mobilize the Army: CSS is a critical part of the mobilization process. As units transition from peacetime to crisis or war, United States (U.S.) Army forces must be quickly brought to wartime readiness in equipment, personnel, supply, maintenance, legal, and medical areas. CSS organizations man and operate mobilization stations and aerial and seaports of embarkation. They also track unit movements. CSS organizations accomplish such tasks while simultaneously mobilizing their own forces. Currently, 70 percent of the CSS forces are in the Reserve Component. The Army trains and equips these organizations to mobilize and deploy forces, as demonstrated during Operation Desert Shield. During this operation, Reserve Component CSS forces were quickly mobilized and integrated with the active component forces. (FM 4-0 2003, 1-2--1-3)

Conduct Forcible Entry Operations: CSS supports forcible entry operations by aerial delivery, logistics over the shore operations, and ground transportation capabilities. The versatility of CSS organizations make it possible for CSS forces to support forcible entry operations and quickly convert to sustainment operations, when terrain is secured. The modular aspect of CSS organizations allows them to be tailored as rapidly deployable and tailororable early entry modules. This capability enhances their ability to support forcible entry operations. (FM 4-0 2003, 1-3)

Dominant Land Operations: The commander generates and sustains combat power to accomplish his mission by effectively and efficiently providing CSS.

The Army CSS system, as a part of the joint personnel and logistics system, provides personnel, equipment, munitions, fuel, transportation support, and other services required to bring combat operations to a decisive conclusion. Sustained land operations establish the long-term conditions required by the United States to support National objectives. Army forces are inherently durable, self-sustaining, and self-replenishing. Robust CSS makes sustained land operations possible. CSS consists of a network of people, organizations, and agencies from the continental United States (CONUS) to the area of operations (AO). Sustaining an operation requires close coordination between joint force and CSS planners; they work closely in planning, preparing, executing, and assessing every phase of an operation. Equipped with the latest technology, CSS commanders deliver personnel and materiel to the joint force commander (JFC), when required to increase his operational reach and sustain operations. Future enhancements in CSS technology will give commanders and CSS planners a more accurate common operational picture (COP) to better support Army and joint forces. (FM 4-0 2003, 1-3)

Provide Support to Civil Authorities: Prompt Army assistance to civil authorities is often a critical and decisive element in disaster relief and crisis resolution. For example, following Hurricane Andrew in 1992, CSS organizations worked closely with the Federal Emergency Management Agency (FEMA), providing food and water, shelter, clothing, health services, and morale and legal support (FM 4-0 2003, 1-3--14).

Shape the Security Environment: In support operations, CSS forces make up a large part of the effort. CSS may be obtained through such activities as contracting support for field services, maintenance, and storage facilities that help foster economic prosperity in some nations. Through many day to day interactions, CSS forces bolster and strengthen multinational partnerships and foster the development of democratic institutions. (FM 4-0 2003, 1-2)

This again represents a significant change between the two documents in that it now links the priorities of Combat Service Support with the maneuver commander's mission. Whereas FM 100-10 made little attempt to nest CSS actions with customers, FM 4-0 makes it the first priority.

In FM 4-0, the five CSS characteristics have been expanded to eight. Only two characteristics from FM 100-10 remain--responsiveness and integration. Although one--anticipation--is now a subset of responsiveness. The fact that improvisation has been deleted as a characteristic is a third significant change. This takes into account lessons learned from operations between 1995 and 2003 and no longer relies on the creativity of individuals to make up for a lack of resources. This doctrinal change will be reflected later in organization changes resulting in greater capabilities. The definitions of responsiveness and integration did not change significantly and the definitions of the six new characteristics are:

Flexibility is the ability to adapt CSS structures and procedures to changing situations, missions, and concepts of operations. CSS plans, operations, and organizations must be flexible enough to achieve both responsiveness and economy. The CSS force provides support in any environment throughout the spectrum of conflict and adapts as operations evolve. Flexibility may require improvisation (inventing, arranging, or fabricating what is needed from what is on hand). When established procedures do not provide the required support, CSS personnel seek innovative solutions, rapidly devise new procedures, or take extraordinary measures to adapt to the situation. (FM 4-0 2003, 1-4--1-5).

Sustainability is the ability to maintain continuous support during all phases of campaigns and major operations. One of the characteristics of land combat is duration. CSS personnel must work with operations planners to anticipate requirements over the duration of the operation and with CSS operators to synchronize provision of required supplies and services throughout. CSS personnel must effectively perform their roles to attain the minimum combat power, then be able to follow on with additional resources to sustain operations for as long as required. (FM 4-0 2003, 1-5)

Survivability is the ability to protect support functions from destruction or degradation. CSS survivability is a function of force protection, which consists of those actions to prevent or mitigate hostile actions against personnel, resources, facilities, and critical information. Integrating CSS with operation plans and force protection plans is critical to CSS survivability. Economy, through such methods as CSS reach operations (discussed in paragraph 3-18) contributes to protecting capabilities by limiting the CSS resources that require protection. Dispersion and decentralization of CSS operations may also enhance survivability. The

commander may have to balance survivability with economy in considering redundant capabilities and alternative support plans. (FM 4-0 2003, 1-5)

Economy means providing the most efficient support to accomplish the mission. Resources are always limited. The commander achieves economy by prioritizing and allocating resources. Economy reflects the reality of resource shortfalls, while recognizing the inevitable friction and uncertainty of military operations. Many CSS developments focus on the ability of the CSS commander to provide required support with the minimum expenditure of resources. Modular forces, split-based operations, and joint and multinational support coordination are some of the methods used to meet these goals. Emerging information technology with modern software packages continue to enhance economy of CSS resources. (FM 4-0 2003, 1-5)

Simplicity means avoiding unnecessary complexity in conducting (planning, preparing, executing and assessing) CSS operations. It fosters efficiency in National and theater CSS operations. Mission orders, drills, rehearsals, and standardized procedures contribute to simplicity. Emerging CSS information systems can be highly efficient tools to help with such tasks as establishing clear support priorities and allotting supplies and services (FM 4-0 2003, 1-4).

Attainability is generating the minimum essential supplies and services necessary to begin operations. Before an operation begins, the focus of the CSS effort is on generating combat power. The commander sets the minimum level of combat power he needs before an operation begins. This requires integrating operations and CSS planning. It involves the ability to identify and accumulate the critical resources required at the start of an operation (FM 4-0 2003, 1-5).

Finally, the tactical logistics functions and CSS characteristics mentioned in FM 100-10 have been merged into simply CSS functions. Instead of five tactical or six general functions, there are now nine. This represents a more detailed look at what CSS provides the warfighter. The new CSS functions are:

1. Supply and Field Services
2. Transportation Support
3. Ordnance Support
4. Health Service Support
5. Human Resource Support
6. Financial Management
7. Legal Support to Operations
8. Religious Support
9. Band Support (FM 4-0 2003, 6-1--14-1)

Now that doctrine that covers CSS in general has been discussed, it is time to look at the different levels of tactical organizations that make this doctrine a reality. One of the first changes made to tactical logistics is that it was simplified into three echelons of logistics--the theater sustainment command, the sustainment brigade and brigade level logistics. This is a departure from the legacy system that included support that the brigade, division, corps, and theater level and several associated units with each. First, we will discuss the changes to logistics at the theater level.

“TSC”--What Does It Mean?

In the legacy system, the largest logistics organization was the Theater Area Army Command (TAACOM). The doctrine governing that organization came out of FM 63-4, *Combat Service Support Operations: Theater Army Area Command*, dated September 1984. That organization has been renamed and is now officially called the Theater Support Command (soon to be officially renamed the Theater Sustainment

Command). The TSC's doctrinal publication is FM 4-93.4, *Theater Support Command*, dated April 2003.

The TAACOM, the support organization immediately subordinate to the theater commander, had three primary missions:

1. To provide direct CSS, less movement control and line-haul transportation, to units located in or passing through its assigned area, including personnel and administration support, intermediate maintenance, the provision of most classes of supply (exceptions being nuclear ammunition and class VIII), DS- and GS-level field services, and local transportation (FM 63-4 1984, 2-3).

2. To support the corps with specified logistics support and the overall theater supply system with maintenance in support of the supply system, under work-load direction of the theater army through the TAMMC. The TAACOM also coordinates area-related functions, such as circulation and population control, with HN elements and supervises and coordinates real property maintenance activities with the ENCOM through its area support groups (FM 63-4 1984, 2-3).

3. The TAACOM is responsible for rear area protection within its assigned area (FM 63-4 1984, 2-3).

In order to accomplish those missions, the TAACOM was able to task organize under its headquarters, a number of types of units. However, the TAACOM did have a typical organizational structure which one could almost call "fixed" (see figure 1). This organization represents the TAACOM's original design--to support a conventional fight on a contiguous battlefield. As can be seen, there is no theater opening or force reception capability and really only one type of subordinate CSS brigade--an area support group--in

the organization. The TAACOM was designed to deploy as a single organization and focused primarily on supply and maintenance. A complimentary transportation command (TRANSCOM), medical command (MEDCOM), personnel command (PERSCOM), and engineer command (ENCOM) rounded out CSS support to the theater.

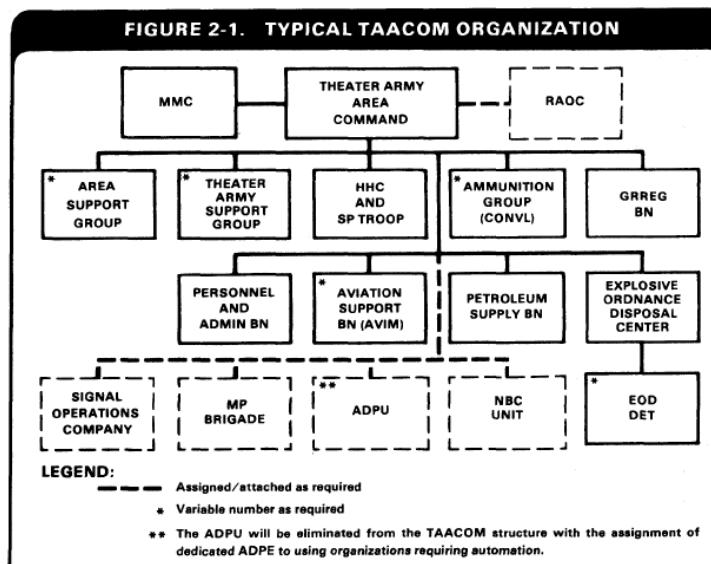


Figure 1. Typical TAACOM Organization

Source: Department of the Army, FM 63-4, *Combat Service Support Operations: Theater Army Area Command* (Washington, DC, September 1984), 2-3.

The Theater Support Command is much like the TAACOM in that it requires the complimentary organizations above in order to support a theater. What makes the TSC different is that it is now clearly part of the joint and multinational fight. The mission of the TSC is to maximize throughput and follow-on sustainment of Army forces and other supported elements regardless of the scale of operations. The TSC provides area support to the operational-level units in the AOs and overall sustainment support to Army forces.

Finally, the TSC also executes those lead service common user logistics (CUL) support requirements that the Army Service Component Commander (ASCC) assigns.

With respect to joint and multinational support, there are sections in FM 4-93.4 dedicated to each. This represents the only true change between the two organizations--past and present.

Although not an official publication, there is an additional concept with which the Army is experimenting and that is the creation of a Sustainment Command (Expeditionary) or SC (E). The SC (E) is the TSC's initial presence for expeditionary operations. The SC (E) headquarters is a fixed structure and can be employed independent of the TSC. Its mission is to provide a forward presence in a specific region. The composition of the SC (E) will be addressed in the next section, but the fact that it is in development represents a move towards the Army as an expeditionary force.

CSS “Brigades”

The next doctrinal comparison we will conduct is the command and control of the brigade level CSS organizations. Prior to the RML, there were three brigade level organizations, the Division Support Command (DISCOM), Corps Support Group (CSG), and Area Support Group (ASG). Each had interface with a headquarters fighting at a different level of war. Doctrinally, DISCOMs supported tactical operations through their support to a division that generally fought at the tactical level of war. CSGs supported tactical operations as well, but doctrinally supported organizations that enhanced the Corps--generally and operational level--fight. Finally, ASGs--also charged with supporting tactical operations--normally were located in the COMMZ, and interfaced with the land component command headquarters--whose actions influenced the strategic

level of war. The new sustainment brigade is designed to support units associated with all three of the above mentioned headquarters. That fact coupled with the contemporary operating environment means that the actions of these new CSS brigades will be more likely to have a strategic level impact while supporting tactical operations.

The doctrine that will be examined is the following: FM 63-2, *Division Support Command, Armored, Infantry and Mechanized Infantry Divisions*, dated May 1991; FM 54-30, *Corps Support Groups*, dated June 1993; and FM 54-40, *Areas Support Groups*, dated October 1995. We will examine the doctrine governing their mission, organization, and employment on the battlefield and compare that to the only like organization that exists in the current Army inventory, the Sustainment Brigade--governed by the draft document, FM 4-93.2, *The Sustainment Brigade*, dated December 2005.

Area Support Groups (ASGs) serve as the logistics headquarters in the Communications Zone. They are responsible for command and control of three to seven battalions with the following responsibilities:

1. Provide CSS to units in and passing through its AO (FM 54-40 195, 2-1)
2. Absorb the logistics requirements that are beyond the capability or capacity of the corps (FM 54-40 195, 2-1)
3. Augment DISCOMs or Corps Support Commands (COSCOMs--Higher headquarters of CSGs) as required (FM 54-40 195, 2-1)
4. Noncombatant evacuation operation support (FM 54-40 195, 2-1)
5. Initial reception of units and equipment at aerial ports of debarkation or sea ports of debarkation (FM 54-40 195, 2-1)
6. Maintenance and issue of theater war reserves (FM 54-40 195, 2-1)

7. Establish and operate cantonment-type facilities through an assigned base support battalion (FM 54-40 195, 2-1)
8. Integrate HNS into the US Army logistics support system through its attached civil affairs battalion and CA teams (FM 54-40 195, 2-1)
9. Out-of-sector support for US Army units deployed out of sector in support of another nation, an alliance, or sister service (FM 54-40 195, 2-1)

No two ASGs are organized alike. They are task organized to provide support to units in the theater and to support the theater supply system. In addition to functional battalions, ASGs may be assigned civil affairs battalions, base support battalions (which provide essential services to installations), and area support battalions (multifunctional crisis response battalion) (see figure 2).

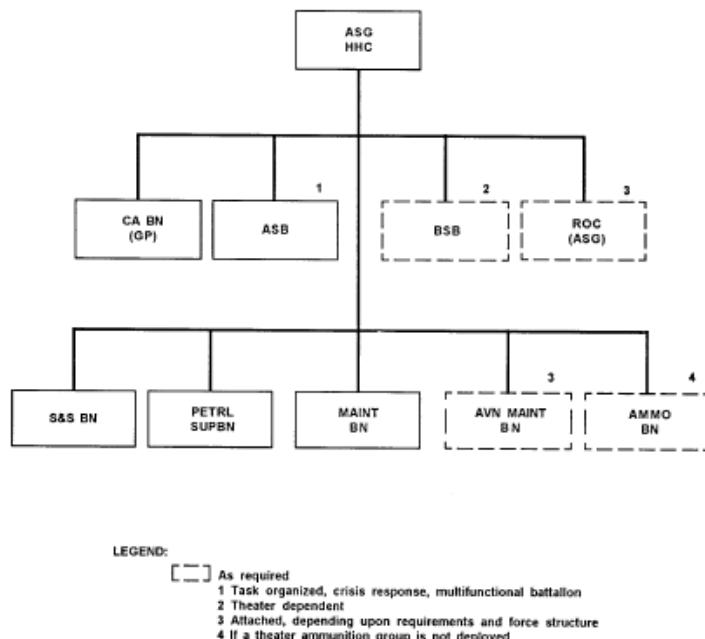


Figure 2. Typical ASG Organization
Source: Department of the Army, FM 54-40, Area Support Group (Washington, DC, October 1995), 2-11.

Like ASGs serve the theater, Corps Support Groups are the primary source for logistics support for corps forces. They are generally designed to provide command and control for three to seven subordinate battalions. Corps Support Groups come in two varieties, the Forward CSG and the Rear CSG. Forward CSGs are designed to support the following:

1. Support on an area basis to nondivisional forces operating in a division area.

For example, engineer, military police, signal, and chemical units assigned to the corps, but working in a division area to support a corps plan (FM 54-30 1995, 1-5--1-6).

2. Augmentation of DISCOM subordinate battalions providing support to nondivisional units attached to the division. For example, corps field artillery, air defense artillery, and engineer units attached to support a division plan (FM 54-30 1995, 1-5--1-6).

3. General and reinforcing support to DISCOM subordinate battalions supporting the division (FM 54-30 1995, 1-5--1-6).

Rear CSGs are designed to support the following:

1. Corpswide combat service support (FM 54-30 1995, 1-6--1-7)
2. Area support to any units passing through its area of operation (FM 54-30 1995, 1-6--1-7)

3. Reinforcing support to the Forward CSGs (FM 54-30 1995, 1-6--1-7)

Other than the normally assigned mission of the two types of CSGs, the composition of each was normally a little different. Although this will be described in more depth later in this chapter, simply put, Forward CSGs were normally composed of multifunctional support battalions with functional companies while Rear CSGs *could* be

composed of functional (transportation, supply, etc.) battalions. Finally, no CSGs had medical units or the responsibility to provide combat health support (see figure 3).

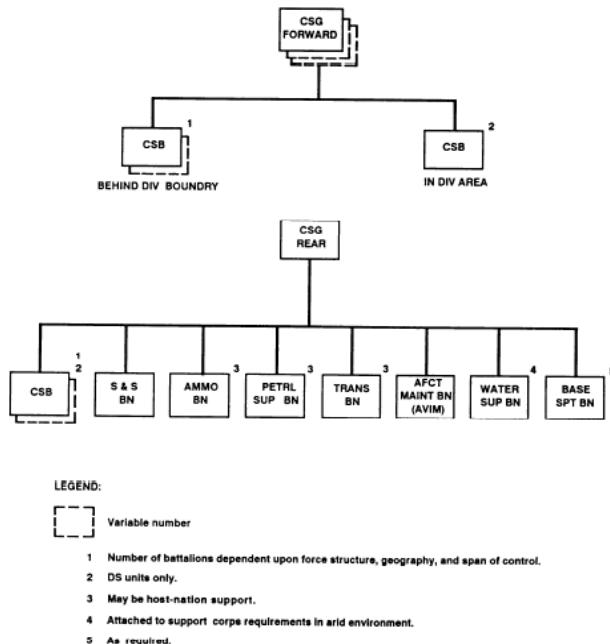


Figure 3. Typical CSG Organization

Source: Department of the Army, FM 54-30, *Corps Support Groups* (Washington, DC, June 1993), 2-11.

DISCOMs provide division-level logistics and health service support to all organic and attached elements of the division. It has no ability to provide CSS to non divisional units operating in its AO. In fact, it relies on the following in order to conduct its mission.

1. Corps transportation to bring supplies forward to the DSA and BSAs (Class IV, V, and limited III) (FM 63-2 1991, 1-1--1-2)

2. The division aviation brigade or corps medium helicopter units for airlift needed to support logistics requirements (FM 63-2 1991, 1-2)
3. Additional water support distribution (FM 63-2 1991, 1-2)
4. Nondivisional field service units for laundry, bath, clothing exchange, and graves registration (FM 63-2 1991, 1-2)

Unlike the ASG and CSG, the DISCOM is a fixed organization. It is composed of a multifunctional forward support battalion (FSB) for each maneuver brigade assigned to the division and a main support battalion (MSB), providing reinforcing support to the FSBs and non-brigade units in the division.

Now that we have discussed the legacy CSS brigades, let us discuss what all of these brigades have morphed into as a result of transformation--the Sustainment Brigade. FM 93.2, *The Sustainment Brigade (Coordinating Draft)* is the doctrinal publication that will be used for comparison.

The sustainment brigade's mission is to provide CSS to the division and corps and forces attached to it (FM 4-93.2 2005, 2-2). The sustainment brigade is not a fixed organization (see figure 4)--depending on its mix of assigned battalions, it can support at the tactical, strategic, or operational level to Army, joint, and multinational forces. Unlike DISCOMs, CSGs, and ASGs, sustainment brigades do not rely on other organizations to provide support--they rely on other sustainment brigades.

Sustainment brigades are normally task organized into three roles--tactical sustainment, theater opening, and theater distribution. In the tactical role, sustainment brigades provide sustainment support within the AO of the unit it is supporting. Each sustainment brigade is capable of providing replenishment and sustainment support for

up to eight brigade-sized units. The sustainment brigade can be tasked to provide theater opening capabilities. The sustainment brigade will be tailored to establish, conduct and maintain early entry operations. Finally, the sustainment brigade can be tasked to provide theater distribution--owning and operating modes as well as the theater distribution network (nodes, rest halts, and distribution hubs) from the theater base distribution hub to the tactical sustainment brigades or BSBs (FM 4-93.2 2005, 2-2). Distribution operations include: receive, store, issue, distribute, redistribute, trans-load, configure, reconfigure, classify, and collect stocks and unit equipment. It also includes the reception and transportation of units and replacement personnel (FM 4-0 2003, 1-10).

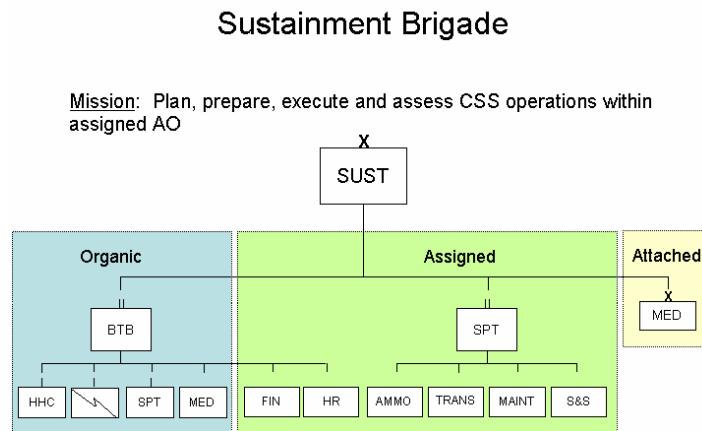


Figure 4. Sustainment Brigade Organization
 Source: U.S. Army Training and Doctrine Command, *Army Comprehensive Guide to Modularity, Version 1.0* (Fort Monroe, VA, October 2004), 5-24.

Brigade Combat Teams

The two doctrinal publications that govern the Forward Support and now Brigade Support Battalions pre and post transformation are FM 63-20, *Forward Support*

Battalion, dated February 1990 and FMI 4-90.1, *Heavy Brigade Combat Team Logistics*, dated March 2005. Essentially the doctrine for these multifunctional support battalions is the same. In 1990, the Forward Support Battalion had the following mission: provide direct support to the brigade and division units operating in the brigade area (FM 63-20 1990, 2-1). In 2005, the mission has become: provides support to brigade level combat teams (FMI 4-90.1 2006, 3-1). Other than the additional task or providing support to non brigade units in its AO (which may be implied for the BSB), there is no change. The change at this level occurs in the organization, capabilities, and leadership (chain of command).

Summary--Doctrine

The changes to doctrine have been evolutionary in nature. The Army clearly learned lessons from past operations and as a result, adjusted characteristics and functions of CSS that it holds valuable. It recognized the requirement to operate as part of a coalition and thus changed its publications numbering system and addressed joint and multinational support in its doctrine. It realized that successful logistical support of an operation cannot be left in the hands of capable individuals without the appropriate resources and adjusted its characteristics. Finally, it realized that logistics is broad in scope and nature by itself and simplified its basic concept at the tactical level. These changes all mark a natural and logical progression.

Organization

TAACOM vs. TSC

There is not a significant difference between the TAACOM and TSC's staff organizations. Both rely on a robust staff section to coordinate the support it provides. In the TAACOM's case, this organization is called the Materiel Management Center (MMC). In the TSC's case, it is the Distribution Management Center (DMC) (see figure 5).

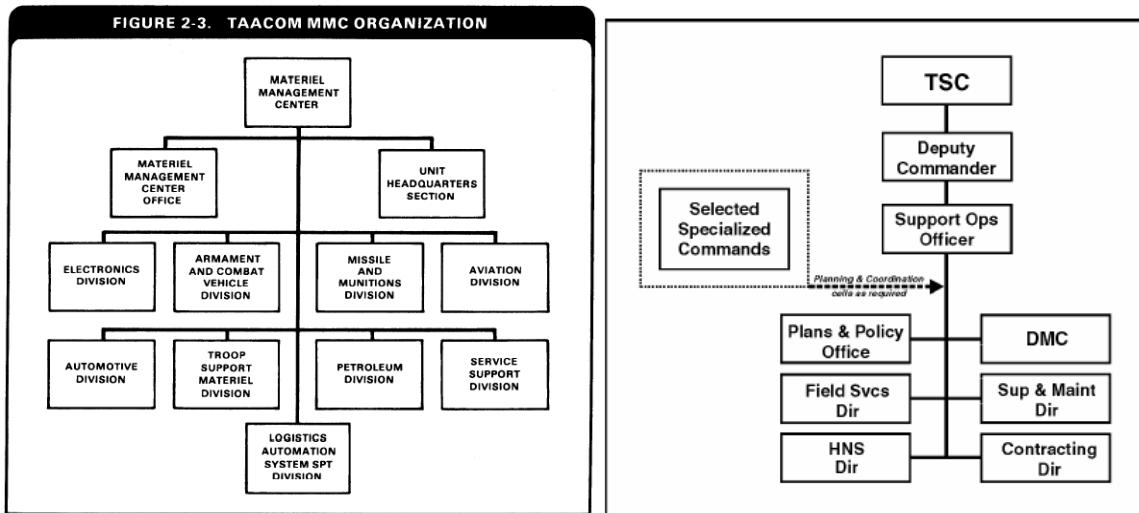


Figure 5. TAACOM vs. TSC Staff Organization

Source: Department of the Army, FM 63-4, *Combat Service Support Operations: Theater Army Area Command* (Washington, DC, September 1984), 2-3; and FM 4-93.3 *Theater Support Command* (April 2003), 3-8.

The TAACOM's Materiel Management Center has the following responsibilities. It serves as a control center for materiel activities in the TAACOM through daily monitoring of supply and maintenance actions. The MMC performs integrated supply and maintenance management in the TAACOM for all classes of supply (less medical and map supply) and for those maintenance activities for which the TAACOM has control

and responsibility. The MMC does not have responsibility for managing the maintenance and supply of TA stocks that may be stored and distributed by TAACOM units (FM 63-4 1984, 2-6). In contrast, the TSC's Distribution Management Center (DMC), under which its MMC is subordinate, synchronizes operations within the distribution system to maximize throughput and follow-on sustainment, and executes priorities in accordance with ARFOR commander directives (FM 4-93.4 2003, 5-2).

The second change and strength of the TSC lies in its ability to deploy the aforementioned SC (E). The staff organization of the SC (E) is like that of the TSC. It has a DMC capable of performing all of the functions of its higher headquarters--only geared towards a specific theater. This capability coupled with the next organizational change allows the Army to more rapidly deploy and build up forces.

CSS Brigades

The organization of the CSS Brigades has already been discussed in some detail. The bottom line is that no two sustainment brigades look the same. Sustainment brigades, which now have the mission of supporting from the tactical to the operational level, can now be task organized to meet a specific mission profile. What has changed is the headquarters composition of sustainment brigades--they are now all the same, unlike the previous myriad of organizations. Under the legacy system, the DISCOM, CSG, and ASG all had different headquarters (see figure 6)--none with the same capabilities. In fact, although a CSG and ASG may be tailored to perform the same specific missions, it would be extremely difficult for them to switch roles or for one to relieve another based on the very different nature of their headquarters.

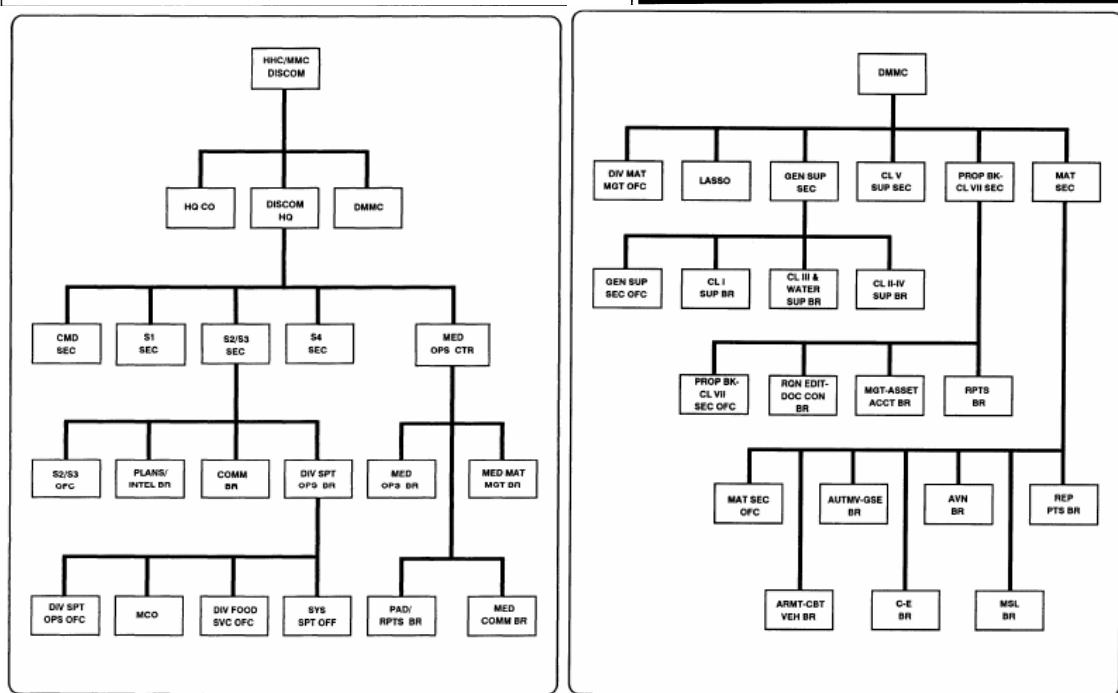
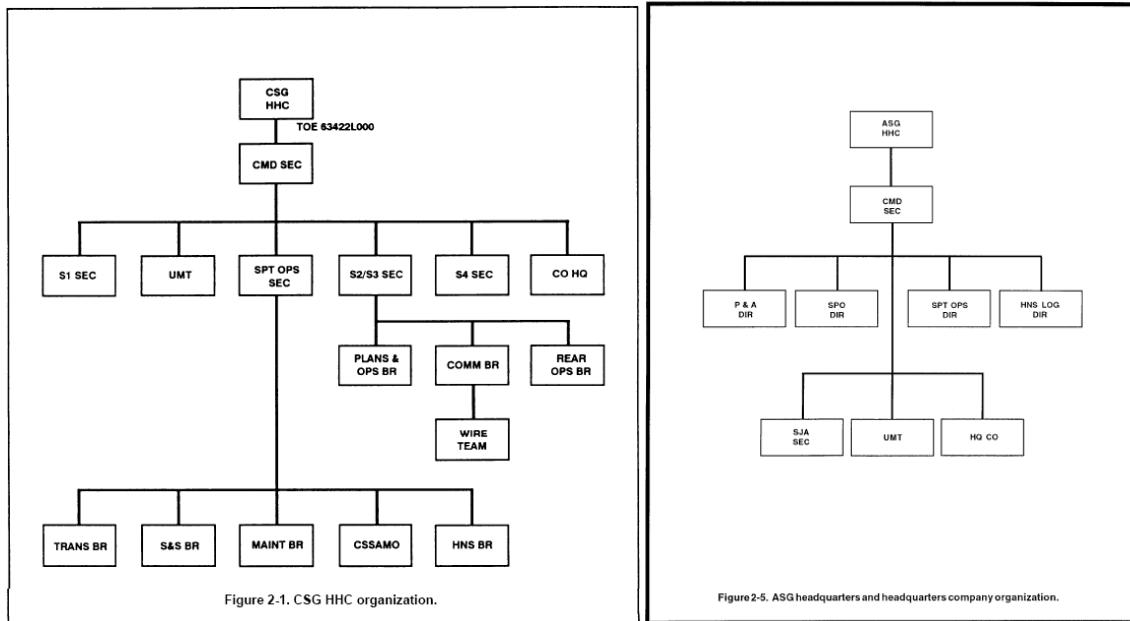


Figure 6. ASG, CSG, and DISCOM Staff Organizations

Source: Department of the Army, FM 54-30, *Corps Support Groups* (Washington, DC, June 1993), 2-2; FM 54-40, *Area Support Group* (October 1995), 2-14; and FM 63-2, *Division Support Command, Armored, Infantry, and Mechanized Infantry Divisions* (May 1991), 2-11 and 3-2.

That is, obviously, no longer the case under the single sustainment brigade. The sustainment brigade headquarters is resourced much like the CSG or DISCOM with a traditional staff and materiel management center (renamed support operations section). This robust capability allows the sustainment brigade to take on the theater wide roll it has been given (see figure 7).

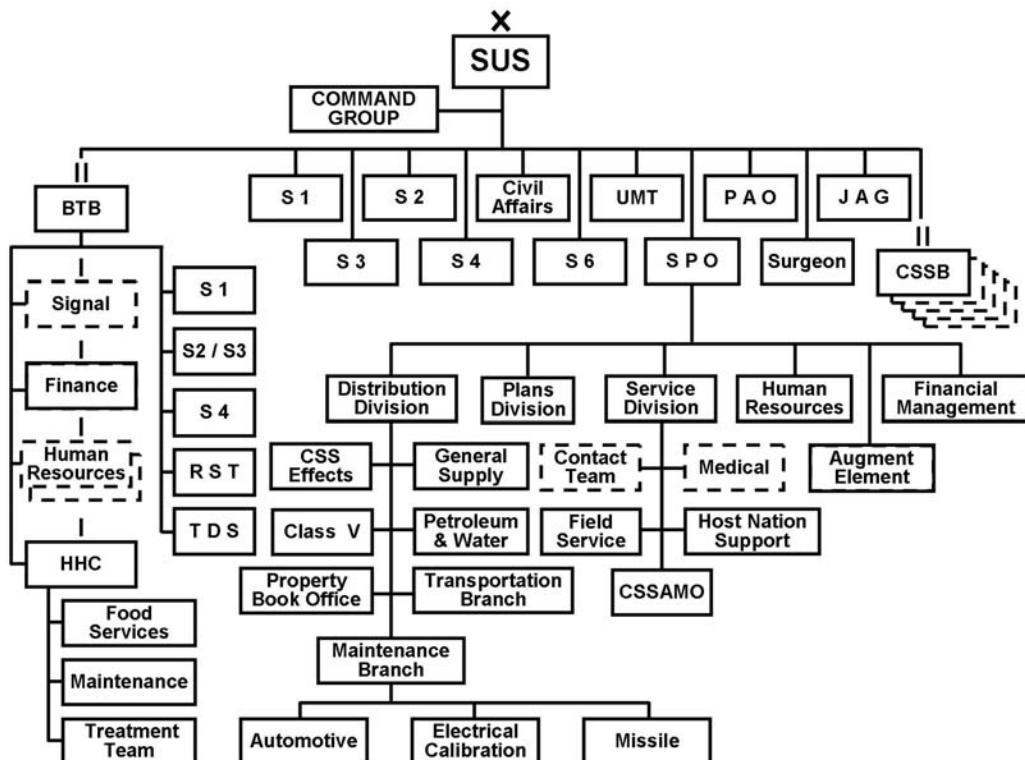


Figure 7. Sustainment Brigade Staff Organization

Source: U.S. Army Combined Arms Support Command, *Modular Force Logistics Concept, Version 5* (Fort Lee, VA, April 2006), B-15.

Brigade Logistics

As mentioned previously, little has changed in the mission of the FSB versus the BSB. What has changed is the organization and capabilities of the brigade's support battalion and the placement of combat service support within the brigade.

In the legacy brigade, the Forward Support Battalion was made up of four companies, a Headquarters Company, Supply Company, Maintenance Company, and Medical Company. With these companies, the FSB supported a maneuver brigade composed of 3 maneuver battalions (Armor, Mechanized Infantry or Infantry), a field artillery battalion, engineer company or battalion (depending on the organization) and a number of "slice elements" ranging from section to company size of signal, military police, air defense artillery, chemical, and military intelligence units. The FSB was designed to support the organic units to the brigade (armor-mechanized infantry-infantry, field artillery, and engineer) and had to be augmented from the Main Support Battalion in order to adequately support a brigade combat team (BCT), as the brigade was known with all of its augmentation. This proved to be a coordination and command and control issue whenever the BCT was formed.

The Brigade Support Battalion supporting a permanent BCT structure solves that problem. Now, in addition to the four previously stated companies, the BSB has a multifunctional forward support company (FSC) for each maneuver battalion and an FSC for the field artillery battalion. The previously mentioned engineer company-battalion has been absorbed by the maneuver battalions and the slice elements rolled up into a Brigade Troops Battalion that has its own organic CSS. While the forward support companies are not really a novel concept--they simply replace the headquarters companies (HHCs) of

the maneuver battalions. What is new is their command relationship with the BSB and their leadership (FMI 4-90.1 2006, 3-1--3-65).

HHCs were traditionally commanded by combat arms officers and worked directly for the maneuver battalion commanders. Although they tied into the FSB for support, they received no official oversight from the FSB commander, and the senior logistician in the brigade had no latitude to move assets from HHC to HHC to best support the fight--thus jeopardizing one of the CSS characteristics--economy. Now the BSB commander has some influence over the employment of FSCs and can better influence the brigade fight.

The next change is the addition of assets to the BSB--specifically in terms of transportation, ammunition, field services, and staff support. Traditionally, the FSB was augmented with transportation support from the Main Support Battalion--for a number of reasons--to help move the FSB, distribute supplies, perform non standard casualty evacuation, and other non standard missions. The BSB now contains a transportation platoon in order to cover that wide range of missions. The second improvement is the addition of ammunition holding and transfer to the BSB. In the legacy FSB, ammunition transfer was the only capability available, however, that did not always satisfy the requirements of the operating environment, with the lack of transportation assets, stocking ammunition in anticipation of future operations, and the sometimes static nature of the contemporary operating environment. Therefore, the ability to store ammo became paramount and a welcome and necessary addition to the BSB's capabilities. The third addition is that of water production. One of the Army's greatest challenges logically has been the distribution of water. Typically, this was mitigated by deploying the MSB's

Reverse Osmosis Water Purification Units (ROWPUs) into brigade AOs so water could be produced locally rather than having to be transported and distributed. This was done with such frequency that it is natural that ROWPUs become part of the BSB rather than routinely attached to it. The final change to the organization of the BSB was the expansion of the Support Operations Section, the staff section responsible for coordinating Combat Service Support to the BCT. The SPO section was expanded from eight to 22 Soldiers (FMI 4-90.1 2006, 3-1--3-65).

Summary--Organization

The examples above represent a revolutionary shift in logistics organizational structures for the following reason. The key to the Army's transformation is its shift from a division centric force, focused on the employment of 10 divisions, to a brigade centric force, focused on the employment of 58 brigades. It has taken what used to be an organization formed for only for deployment (a BCT) and made it a permanent, fixed organization. It has done this in some part, as will be discussed later, to support the Army Force Generation (ARFORGEN) Model. It has done the polar opposite with logistics units, eliminating fixed structures above the BSB level. While COCOM Commanders can select from a fixed menu at the brigade level, they have to order logistics a la carte. This seems like a logical way to support forces with a more capable BSB, and in hindsight, may seem evolutionary in nature. However, making the leap to multifunctional logistics down to the company level and relying on the ability of logistics organizations to form to meet a specific mission set and deploy in a relatively short period of time required revolutionary thought and quite a bit of faith.

Training

The first change on which to focus is the development of more capable logistics officers. Four institutional initiatives are working to create a population of more competent company and field grade officers--specifically logisticians. The first is the creation of the Basic Officer Leadership Course (BOLC). BOLC is an initiative designed to support the CSA's statement that every soldier is a rifleman first. BOLC is a six week, field intensive course run by the United States Army Infantry Center & School for all newly commissioned second lieutenants. The goal of BOLC is to create competent, confident, and adaptable officers, grounded in warrior tasks, able to lead Soldiers in the contemporary operational environment (BOLC Overview).

The second officer initiative is the decision to once again allow CSS soldiers to attend the 61-day Ranger School. In the past, attendance at Ranger School was limited to combat arms soldiers and those who were assigned to the 75th Ranger Regiment or the Ranger Training Brigade. The change came about as a part of Task Force Soldier, a focus area of the Army Campaign Plan. TF Soldier concluded that more Ranger-qualified leaders would help to accomplish the goal of instilling the warrior ethos throughout the Army. The result of the first two initiatives is that more tactically proficient leaders (specifically in the officer corps) will now be leading soldiers into combat (Gildin 2005).

The third officer initiative is the decision to send all majors in the Operational Career Field (predominantly working in deployable units) to the year long Intermediate Level Education (ILE). In the past, only 50 percent of majors in the United States Army were allowed to attend the resident phase of this school. The Army has recognized that one of the traits that allow it to move personnel and units around and change chains of

command and organizational structures is the common understanding of doctrine that field grade officers have as a result of institutional schooling and that ILE enables that understanding.

The fourth officer initiative is tied to an issue that will be discussed in the personnel section of this analysis--the creation of a multifunctional logistician. In depth discussion of the genesis and current status of the Combined Logistics Captains' Career Course (CLC3), replacing the company grade officer education system of the Army's logistics branches, will occur in that section.

The second training change on which to focus is the change to the United States Army's *Standards in Weapons Training* (codified in DA Pamphlet 350-38). Prior to 2004, the Army allocated resources and required units to conduct weapons training based upon the type of unit. CSS units were required and allocated to qualify with their weapons only half as much as combat arms units and were not required to conduct any type of collective livefire. With the 30 September 2004 edition of DA Pam 350-38, *Standards in Weapons Training*, that changed. Now CSS units are required and given resources to shoot as much as combat arms units. That change coupled with the following means that CSS units, already led by more tactically proficient leaders, are now entering combat with better training at the individual and collective level.

The third fundamental change in training is the emphasis by the Combined Arms Support Command (CASCOM) and Training and Doctrine Command (TRADOC) on producing tactics, techniques, and procedures (TTPs) and building facilities to conduct convoy and base defense live fires. Prior to 1995, neither a base defense nor a convoy livefire facility existed at any of the Army's three premier training facilities the

Combined Training Centers. That all changed when the 201st Forward Support Battalion conducted a Brigade Support Area (BSA) livefire in October 1995 at the National Training Center. Since that time, facilities for conducting both training events vital to the survival of logistics have been constructed at all three Combined Training Centers, many units' home stations, and convoy livefire training is required prior to deploying to either Iraq or Afghanistan.

Some level of parity has been established in training all branches of the Army. Although initially entry training has been the same for all Soldiers since World War II, sustained training has not been equal amongst organizations in the recent past. There will always remain disparity between combat arms and CSS organizations, based on their unique mission requirements, but one would be hard pressed to say that CSS units are not receiving all of the training resources they require. That is coupled with a focus on tactical proficiency of leaders supported by institutional training that is open to all.

However, to call this focus in training revolutionary would be wrong. Again, it is a natural reaction to the Army's current operations. Perhaps the revolutionary event is that the Army is not only retaining, but also expanding its institutional training as it continues to prosecute the Global War on Terror.

Materiel

There are two significant changes to materiel for the United States Army that has impacted the RML. The first is the change in the Army's acquisition process and the second is the expectations the Army now has with regards to unit readiness.

Army Acquisition has been a lock step process in which the desired end state was known prior to beginning the process. Milestones had to be met in order for the next step

in the process to occur. The results of this process were twofold. First, they created a product that met all of the performance parameters of the initial concept. Second this took a long time and the end product was usually a uniquely designed product that cost billions to develop and test (see figure 8).

The Defense Acquisition Management Framework

(Single Step – The “Traditional” Acquisition Process.)

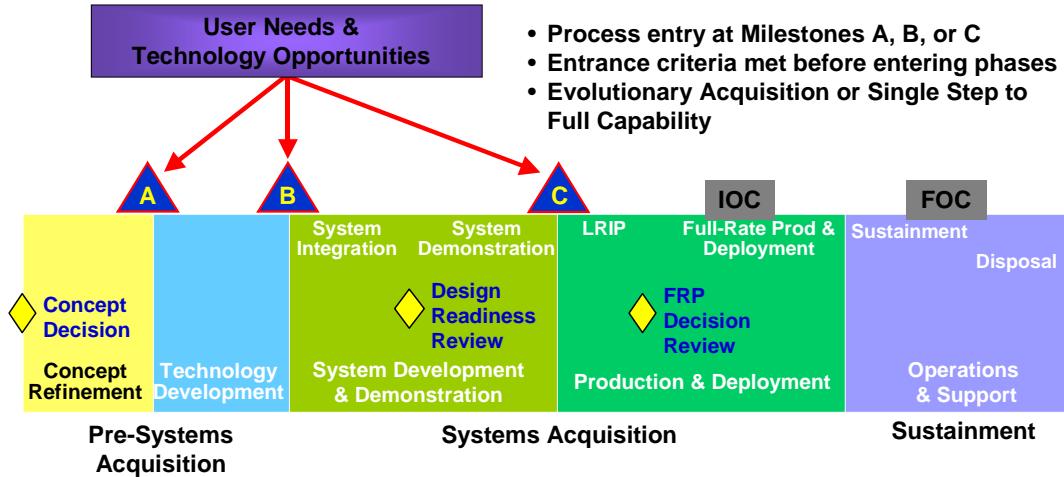


Figure 8. The Traditional Acquisition Process

Source: U.S. Army Command and General Staff College, F103 Operational Change (Presentation to Command and General Staff College students Ft. Leavenworth, KS: USA CGSC, 2005) Slide # 10.

Thanks in part to the Global War on Terror, the Army has seen the need to enhance its acquisition process. It has adopted the evolutionary acquisition process. Now, rather than reaching a milestone before proceeding to the next step, items of materiel are

fielded to the force as they are continually developed. Feedback from the field guides the continual acquisition of the product until it is fully fielded. This results in a product fielded faster and meeting more of the warfighter's needs (see figure 9).

Evolutionary Acquisition – Incremental & Spiral Development

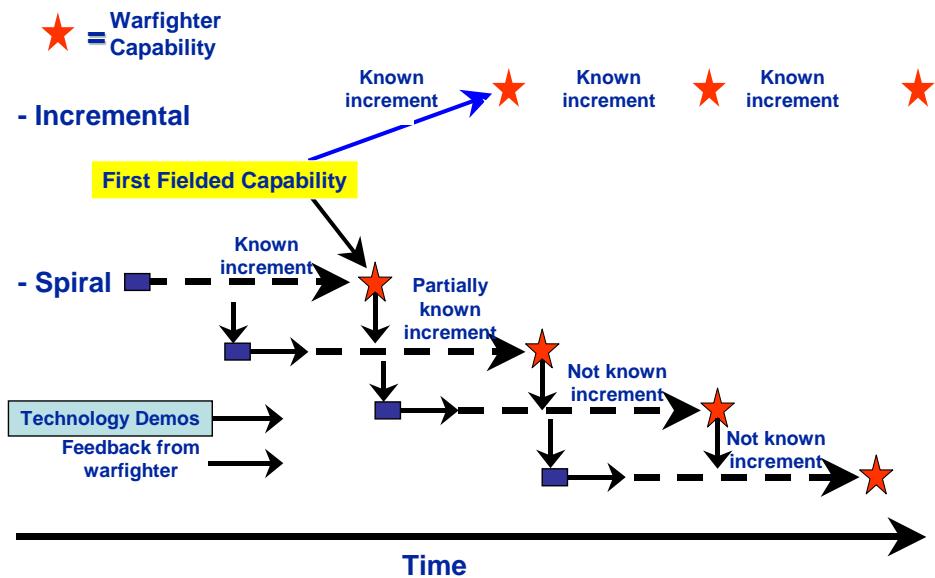


Figure 9. The Evolutionary Acquisition Process

Source: U.S. Army Command and General Staff College, F103 Operational Change (Presentation to Command and General Staff College students, Ft. Leavenworth, KS: USA CGSC, 2005) Slide 13.

Two outstanding programs that have come out of the evolutionary acquisition process are the Rapid Fielding Initiative (RFI) and the Rapid Equipping Force (REF). The mission of these programs is to respond quickly to real-world equipment requirements by providing operational commanders with rapidly employable materiel solutions to enhance lethality, survivability and force protection through insertion of

COTS, GOTS, or near-term developmental items and future force technologies while informing Army stakeholders to remain ahead of an adaptive enemy. They fill materiel requirements that are not available through the Army's traditional supply and logistics system. Their equipping cycle is measured in weeks--sometimes days--from operational field commanders articulating a requirement (ONS) to the Army providing a solution. RFI focuses on products that enhance individual survivability while REF focuses on larger materiel issues.

In regards to unit readiness, in the past, the Army has revolved around a once monthly report called a Unit Status Report. The Unit Status Report was essentially a report card on how the unit was doing in manning, equipping (to include availability and readiness of equipment), and training. Additionally, the Army used the Authorized Level of Organization (ALO) table to determine at what level to allocate unit equipment and personnel. CSS units were normally ALO II (meaning lower in priority than ALO I) units. A Force Activity Designator (FAD I through V) was also used to categorize units on their basis of military importance. Therefore, a CSS unit could be an ALO II, FAD III unit, meaning it would be sixth on the priority for personnel and equipment.

In October 2005, the Army introduced what it calls the Army Force Generation (ARFORGEN) model for manning, equipping, and training units. Rather than being tied to a static organization, now units are given priorities based on their likelihood to deploy. The ARFORGEN model broken down looks something like this. Operational units progress through three Force Pools (Reset-Train, Ready and Available), their resourcing and readiness based on what it is they have to be ready for. That progression is known as the operational readiness cycle. ARFORGEN recognizes that units will have to build up

their readiness over time (as they progress through the operational readiness cycle) to meet specific mission demands. Equipment will be “maneuvered” between units to meet readiness requirements. The Army will change from tiered readiness to cyclical readiness.

All units Brigade, Divisions, and Corps will be grouped into one of three Force Pools. Numbered Army headquarters and their associated OPCON units remain non-rotational, non-force pool units. The Force Pools are: 1. Reset/Train: The initial ARFORGEN Force Pool includes units that redeploy from long term operations, are directed to reset-train, or are experiencing significant personnel and or equipment changes or reorganization and are unable to sustain Ready or Available Force capability levels. 2. Ready: The second Force Pool includes those modular units assessed as “Ready” at designated capability levels (from training and readiness “gates”) to conduct mission preparation and higher-level collective training with other operational headquarters. They are eligible for sourcing, may be mobilized if required, and can be trained, equipped, resourced and committed if necessary to meet operational (surge) requirements. 3. Available: The third force pool includes those modular units which have been assessed as “Available” at designated capability levels (from training and readiness “gates”) to conduct mission execution under any RCC. All AC and RC units will pass through a one-year Available Force Pool window (see figure 10) (Ledbetter et al. 2005, 4). This means is that CSS units will receive the same resources as all other units.

Requirements-Based Construct



Figure 10. The ARFORGEN Model

Source: Ledbetter et al., What's an ARFORGEN? *Quarterly Newsletter of the Army Force Management School* (2005), 5.

The author would be remiss, however, in discussing materiel if he did not discuss one of the materiel initiatives that the Army is taking in order to achieve its RML. The Battle Command Sustainment Support System (BCS3) is one of the newest members of the Army Battle Command System (ABCS) family. Its purpose it to provide the CSS input to the Common Operating Picture (COP) of the battlefield. The basic functions of BCS3 are threefold. First, it has a simulation tool that allows the user to project supply consumption for a given COA by event or across time--it essentially does real time and interactive CSS planning. Second, it provides a map-centric view of inbound vehicles and cargo that are equipped with movement tracking devices--it provides in transit visibility (ITV). Third, it gives commanders the latest available status of critical weapon systems, fuel, ammunition, and personnel (ABCS Overview 2005).

BCS3 represents a significant step in achieving RML. First, it is a system that is being developed in conjunction with other Army automation systems with the end goal to provide a common operating picture that includes intelligence, operations, administration and logistics. Second, it is being conducted as a joint development with the United States Marine Corps (USMC) and therefore, is a step in the direction of a joint force.

Summary--Materiel

Unfortunately, in as impressive as the changes in materiel solutions are, they are not revolutionary. They are simply a take on the age old business practice of outsourcing. Just as Wal Mart, a highly successfully business that the Army has already modeled for hub-and-spoke distribution and just-in-time logistics, moved from American made products to foreign suppliers to increase profit margin, the Army is seeking the quickest way to acquire materiel. In the Army's case, the margin is time.

Leadership

There are really only two significant changes to the leadership of tactical logistics units. However, before this subject is explored in any more depth, it must be stated that as organizations are developed and their capabilities increased or decreased, the appropriate level of leadership is applied. Company, battalion, and brigade-sized organizations are still commanded by captains (CPTs), lieutenant colonels (LTCs), and colonels (COLs), respectively. A major general commands the Theater Sustainment Command, which now has a deployable command post, the SC (E), with deputy brigadier general commanders. The real difference is to whom these leaders report.

As discussed in chapter 2, one of the commercial organizations that has been studied for its exceptional performance is the John Deere tractor company. One of John Deere's undying principles is that satisfaction keeps customers returning. The Army has adopted that philosophy, in a sense.

Part of the Army's overarching Revolution in Military Affairs is a movement to a brigade-centric Army rather than a division-centric Army. While this, again, is not a new concept (regimental combat teams fought regularly in World War II), it does mean that brigade commanders now have more responsibility and thus require more assets. Now that the DISCOMs no longer exist, the brigade is the first organization where a logistician works for a warfighter. Support battalions that used to report to a DISCOM commander now report to the supported brigade commander. The Army has now given complete control of logistics to the supported brigade--a focus on customer satisfaction at the brigade level.

In contrast to this, the next level in which a logistician will typically work for a warfighter is at the ARFOR level--at least a one star command. With the focus on brigade-sized organizations and division and corps sized headquarters commanding and controlling them, sustainment brigades do not report to those warfighting commands. Instead, they report to the TSC in theater. While this may seem like a departure from the customer focused reorientation of leadership at the brigade level, it actually gives the TSC commander the ability to flex assets across the battlefield to support the maneuver plan.

The only reason this represents a revolutionary change is that aligning all logistics organizations under a single logistician in a theater is counterintuitive to the action of

placing the BSB commander under control of the BCT commander. The bottom line is that this supports centralized control (TSC and BCT Commanders) and decentralized execution (sustainment brigades and forward support companies). What makes it revolutionary is that the Army could have picked any level to centralize command and control and it selected the lowest and highest echelons.

Personnel

The first change that must be discussed is the realignment of the officer education system, creation of the multifunctional logistician and their impact on the command and control of the logistics branches. Of the 17 branches available to Army officers upon commissioning, seven are combat service support. Of those seven branches, the Army for all intensive purposes has deemed three as logistics branches--Ordnance, Quartermaster, and Transportation. The lineage of the three branches reaches back with the Ordnance and Quartermaster Corps dating back to 1775 and the Transportation Corps to 1942. The three branches were headquartered at three separate installations (Aberdeen Proving Grounds, Maryland; Fort Eustis, Virginia; and Fort Lee, Virginia, respectively) and each had their own officer education system.

In 1992, the Army created a functional area (FA), FA90--Multifunctional Logistician. A functional area is a grouping of officers by a career field other than an arm, service or branch possessing an interrelated grouping of tasks and skills that may require significant education, training and experience. Officers eligible for FA90 included officers in the three aforementioned branches along with officers from the Medical Service Corps (also a CSS branch) and officers from the Aviation Branch who specialized in aircraft maintenance. Although five branches were eligible, the

preponderance of FA90 officers was Ordnance, Quartermaster, and Transportation Corps officers (Juskowiak et al. 2004, 1).

The FA90 job description is essentially this. The multifunctional logistician is competent in planning and directing logistics operations from the factory to the foxhole, across the entire spectrum of logistics functions (arm, fix, fuel, move, and sustain the force). Requires experience in synchronizing and integrating the functions of supply and services, transportation, maintenance, aviation logistics, and medical service.

In 1994, the aforementioned CASCOM was reorganized. The combat developments, doctrinal concepts, evaluation and standardization, and training developments functions at the Ordnance, Quartermaster, and Transportation branch schools were centralized at CASCOM headquarters at Fort Lee, Virginia. The branch schools were now focused on branch-specific instruction. Corresponding with this reorganization was the consolidation of officer training. The Army Logistics Management College (ALMC), under CASCOM, became responsible for running the Combined Logistics Officer Advance Course (CLOAC), since renamed the Combined Logistics Captains Career Course (CLC3). CLOAC educated all of the aforementioned officers on the competencies required to make them FA90--multifunctional logisticians (Juskowiak et al. 2004, 5). Although this change happened pre RML, its proximity in time and the resultant time to realize changes Army wide makes it an RML change.

The officer education system just described remains the same today. However, there have been two meetings in November 2005 and February 2006, which have set a course to take the concept of multifunctional logistician a step further. Headed again by CASCOM has been a proposal to create a Logistics Corps, comprised of the Ordnance,

Quartermaster, and Transportation branches. Although, several courses of action have been proposed, it is likely that the following will occur. Officers will attend their basic officer course upon commissioning in their basic branch (one of the three mentioned above). After their initial tour, they will attend CLC3 and upon graduation, become logisticians--part of the Logistics Corps, not one of the three basic branches. While that seems merely a semantical change from status quo, the resulting change in how officers are managed, assigned, how positions become available, and even what they wear on their uniforms represents a significant shift (Minutes of the Logistics Officer Corps Integrated Concept Team (ICT) Meeting # 3, 8 February 2006).

Although all discussion thus far on personnel (and training) has focused on officer education, there was some discussion on the development of a multifunctional logistics NCO, however, that was tabled until the Logistics Officer Corps has been fully realized. In order to mitigate that, the Battle Staff NCO Course (BSNCOC) exists. BSNCOC is a functional course used to prepare Staff Sergeants through Sergeants Major in all branches for duty in battalion and higher level staff positions. The concepts of Combat Service Support, specifically, maintenance, personnel, field services, transportation, and supply operations are taught at this course (Battle Staff Course Overview).

Finally, as mentioned before, the ARFORGEN model discussed under the Materiel section of this analysis also governs personnel manning. The bottom line is that under the ARFORGEN model, CSS units will no longer be “shortchanged” based on their ALO or FAD designations. They will now be given resources, to include personnel, in accordance with a deployment schedule.

Summary--Personnel

This is perhaps the most revolutionary change in logistics. In a time when the Army is rapidly fielding and equipping units with high technical materiel solutions, it is demanding that its personnel become more of generalists than specialists, which would seem the logical case. Although one could argue that this is really being forced on the Army based on its current OPTEMPO, it would seem that the Army would focus on countering this move were it not a choice. In creating a Logistics Corps, the Army is essentially stating that it has provided the resources and trusts that its quality personnel, provided first class training, can execute all of the nine logistical functions adequately.

This is a change to 231 years of branch parochialism.

Facilities

There was only one significant change to facilities that impacts logistics transformation. This change, like others mentioned, is inexorably linked to other DOTMLPF domains--training and personnel.

As a result of the 2005 Base Realignment and Closure (BRAC) Commission's report, the Ordnance Center and School at APG, Maryland, and the Transportation Center and School at Fort Eustis, VA will relocate to Fort Lee, VA. There, they will merge with the Combined Arms Support Command, the Quartermaster Center and School and the Army Logistic Management College at Fort Lee to form the Army's Combat Service Support Center. This would consolidate CSS training and doctrine development at one installation (Alley 2005).

While this change is linked to a revolutionary process, the change to a Logistics Corps coupled with the consolidation of officer training, it is really evolutionary based on the need to consolidate installations and save money.

Summary

The research question to be answered was: Is the Army's 'Revolution in Military Logistics' truly a Revolution in Military Affairs? Summarizing the results of the DOTMLPF template yields the following answers.

Doctrine--No--While the Army has adjusted doctrine based on lessons learned, clearly learned lessons from past operations, all changes mark an evolutionary progression.

Organization--Yes--While the Army has organized its combat units of action into permanently fixed organizations, it has conducted a polar opposite change to logistics structures in creating fixed headquarters that command and control structures organized for a particular operation.

Training--No--Although some level of parity has been achieved between all branches of the Army, it is merely a natural reaction to the Contemporary Operating Environment.

Materiel--No--Although the evolutionary acquisition process has enabled quick and sometimes inexpensive materiel solutions to be fielded, it is simply a natural progression in a business model that the Army has been following since the RML began.

Leadership--Yes--This represents a revolutionary change is that all logistics organizations outside of BCTs are centrally controlled by the theater command through

the senior logistician in theater. For the first time since the advent of mechanized warfare, division commanders do not control the logistics organizations that provide them support.

Personnel--Yes--In creating a Logistics Corps, the Army is changing 231 years of branch parochialism. It is making this radical shift at a time when the introduction of numerous enablers would make a case against generalization.

Facilities--No--This change is a convenient consolidation that enables changes in training and personnel to take place, but simply part of an evolutionary process to save money.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Introduction

This thesis began by asking if the Revolution in Military Logistics met the definition of a Revolution in Military Affairs as defined by Knox and MacGregor--that and RMA requires the assembly of a complex mix of tactical, organizational, doctrinal, and technological innovations to implement a new conceptual approach to warfare or to a specialized sub branch of warfare (Knox and Murray 2001, 12). In this case the specialized sub branch was logistics, analyzed against the DOTMLPF template.

A subsequent research question focused on defining the Army's tenets for its logistics revolution based on interpretation of documents published on the subject between 1999 and 2004. Using qualitative analysis, a third research question sought to grade how the Army was doing in executing its RML--comparing its desired end state to its progress thus far.

Interpreting the DOTMLPF

In chapter 4, the DOTMLPF template was applied to specific changes the Army has made since 1999 to its logistics construct. So does the sum of its parts add up to its whole? Against the seven aspects of the DOTMLPF, three were determined to have made revolutionary changes and four not. With all of the aspects weighted equally, the answer is simply--no--the Army has not revolutionized logistics to date.

As the qualitative analysis of the seven DOTMLPF tenets were conducted independently, it is logical to look at the changes to logistics as a whole, analyzed against

the definition of an RMA in order to give the revolution a “second opinion.” The four innovations--tactical, doctrinal, organizational, and technological--required for an RMA will be discussed to determine if they come together to render a different report than the DOTMLPF analysis.

First, tactical innovations are conspicuously absent during the RML’s time period. Tactical logistics occurs in essentially the same manner now as it did in 1999. Combat forces are supported by an echelon of logistics that requires two things--stocks of supplies and distribution assets--to accomplish its mission. That echelon of logistics is supported by another echelon that requires and accomplishes the same mission on a greater scope. Although the Army is attempting to streamline this process through materiel solutions (technological innovations) and organizational changes, the process remains the same.

Doctrinal innovations, albeit not revolutionary in nature, have occurred. As discussed in chapter 4, the Army has learned from its past lessons and made appropriate adjustments to its doctrine. However, the doctrine, which is general in nature, by design, has not changed the way logistics is conducted as there has not been much change in the way operations are conducted. The change must come from organizational and technical innovations.

Organizational innovations have occurred and have already been deemed revolutionary. First, there are now only three echelons of logistics, whereas previously there were at least five. Second, the organization supporting the brigade combat team has become a more capable organization. Third, the decision to create organizations capable

of task organizing to meet a specific mission and placing them under the control of a single commander gives logisticians greater flexibility than ever before.

Finally, technological innovations seem to be one of the areas in which the Army will make great strides in achieving its RML. In addition to BCS3, the Army is developing systems that will allow distribution on a three dimensional battlefield--the Joint Precision Airdrop System (JPADS) and Joint Heavy Lift Aircraft; systems (O'Reagan et al. 2005, 49) that will allow more efficient production, storage, and distribution of fuel and water; systems that will enable quicker deployment of forces--the Theater Support Vessel; and systems that allow logistics units to protect themselves--the Armored Security Vehicle (Weapons System Handbook 2005, 28-29).

So again, the question is, Has the sum of these innovations--tactical, doctrinal, organizational, and technical--come together to implement a new approach to logistics? No. While the innovations have occurred with varying degrees of success, there has been no fundamental change to the way logistics is conducted. However, that being said, the Army has accomplished an enormous amount since 1999. How has it stacked up against the stated goals of the RML?

The Army's Report Card

Now that the author determined that the changes made to logistics thus far have not been revolutionary, how do they stack up against the tenets of the revolution in military logistics? In 2004, the Army stated that it had four focus areas that it would hold preeminent for the next two years. Three additional focus areas were identified based on analysis in chapter 4. The first four areas to be discussed were determined by the Army and the next three by this thesis.

Logistics Data Network – The Army’s intent was for logisticians to be an integral part of a joint battlefield, satellite-based communications network, capable of providing full-time connectivity from the battlefield to the industrial base.

Implementation of the aforementioned BCS3, which will be fielded to all active duty units by the end of fiscal year 2007, if it provides everything it promises, will make great strides towards achieving this tenet. However, two key hurdles need to be overcome in order for this tenet to be realized. First, not only does BCS3 need to provide ITV, but TAV. Second, it needs to be able to provide the appropriate level of that information continuously to everyone in the logistics chain--from the operator of a truck to the TSC Commander. Without that capability, it will be impossible to achieve the second tenet.

Responsive Distribution System – The Army’s intent was to develop a distribution-based logistics system, reaching from the source of support to the Soldier, focused on guaranteeing on-time delivery.

The Army has taken all of the steps required by resourcing its own organizations to achieve this tenet. Distribution exists at the brigade level and sustainment brigades can task organize with distribution assets to meet requirements. It must now focus on two things--seamless integration with the capabilities of its sister services, and the use of technological innovations to mitigate the risk associated with physical time and distance on the battlefield. As mentioned previously, BCS3 must provide in transit and total asset visibility in real time. This will allow commanders to make adjustment to resupply operations enroute, determine supply and maintenance requirements and make appropriate actions prior to the critical time, and make the current distribution system truly responsive.

Robust, Modular Force Reception Capability – The Army’s intent was to design an integrated theater opening capability that responds on extremely short notice and executes crucial sustainment tasks immediately upon arrival in theater.

Two specific changes in the Army’s organizational structure have realized this tenet. The first is the creation of the Support Command (Expeditionary), capable of deploying rapidly and providing command and control of a theater logistics network indefinitely or until relieved by a Theater Sustainment Command. The second is the identification of a Sustainment Brigade (Theater Opening). Although, as mentioned previously, Sustainment Brigades are not fixed organizations, the Army has identified the resources required to have a theater opening capability and embedded it into emerging doctrine as a template for an organization to meet this requirement.

Integrated Supply Chain – The Army’s intent was to develop an end-to-end view of the supply chain and integrate service and agency processes, information, and responsibilities by providing joint logistics data freely and automatically between strategic, operational, and tactical levels.

Progress in this tenet still suffers from parochialism in the military. End to end distribution requires the collective efforts of all services, and there are still issues in regards to interoperability, culture, and communications. The development of joint systems such as BCS3, the JPADS, and Joint Heavy Lift Aircraft are helping to mitigate this problem. An additional innovation that may help realize this issue is the development of a Joint Logistics Corps. This will be discussed later in this chapter.

Agile Infrastructure – The thesis concluded that agile infrastructure requires the ability to build and change logistics organizations, deploy and support the infrastructure of a logistics network, and support rapid and flexible acquisition.

The Army has realized this tenet. Due to the organizational changes already mentioned that allow the creation of tailored logistics organizations and the change in the acquisition process, the Army has an agile logistics infrastructure.

Adequate Logistics Footprint – The thesis concluded that an adequate logistics footprint meant sizing logistics organizations so that their capabilities match their missions.

In modifying commercial practices instituted after *ODS*, the Army is on its way to establishing an Adequate Logistics Footprint. This is most apparent in the organization of the Brigade Support Battalion, discussed earlier. The Army needs to recognize that this need exists at other levels and resource them adequately in order to fully realize this tenet.

Joint and Multinational Logistics – The thesis concluded that the Army needs to focus on integrating seamlessly into a coalition by focusing on providing and receiving common user logistics and commanding and controlling joint and multinational logistics assets.

This tenet has not been realized. Currently, joint logistics only exists out of a requirement to use unique assets (such as fixed wing aviation and ships) to distribute supplies. Multinational logistics does not exist most likely out of an issue with command, control, and faith in our coalition partners. However, there are several events that make the realization of the joint aspect of this tenet possible sometime in the future. First is the

joint development of technology. Second is the limited development of joint logistics schools (discussed later in this chapter). Third is the discussion and limited implementation in doctrine of standing joint force headquarters and a joint sustainment command.

Conclusions

Determining the actual goals of logistics transformation proved to be valuable in that it pointed out gaps in initiatives-goals-tenets; established its linkage to joint doctrine; and showed how Army leaders have modified their goals based on world events and successful and not so successful processes. The DOTMLPF proved to be an adequate tool for making a qualitative analysis of tactical logistics changes from 1999 to 2004. As the majority of the analysis was qualitative, personal experience was relied upon heavily.

The Army has achieved two of the seven determined goals of its logistics transformation and is on the way to achieving the other five. However, it is not in the midst of a revolution in military logistics. In fact, the Army needs to drop that phrase altogether and stick with calling it logistics transformation.

Although there have been specific areas in which the Army has revolutionized processes, in general, logistics transformation has been characterized by one of three terms. Logistics evolution--a gradual process in which something changes into a different and usually more complex or better form--by recognizing shortfalls in current TTPs and evolving to overcome those shortfalls; logistics reaction--responding to stimulus--by changing to meet immediate and significant requirements (such as GWOT); and logistics adaptation--something that changes to become suitable to a new or special application or

situation--by recognizing better TTPs being conducted by sister services or commercial businesses and applying them to Army systems.

Since the Goldwater Nichols Department of Defense Reorganization Act of 1986, the military has been actively pursuing the task of becoming more joint. Successful operations in the Persian Gulf and the Balkans are testament to the effort. In achieving those goals, perhaps logistics can be truly revolutionized. As pointed out in chapter 4, there is little that can change fundamentally to how the Army supports itself at the tactical level. In fact, there is little if anything left to revolutionize in how Army logisticians conduct business. So rather than expending energy in trying to revolutionize processes that already work well, the Army needs to continue making an evolutionary leap and embrace joint logistics, as the USMC and Air Force already have out of necessity.

The Army needs to take advantage of three key factors now in order to kindle this revolution. First, it must capitalize on lessons learned from current operations--in specific with regards to supporting a joint force. Second, it must take advantage of the changes already accomplished in the last ten years and continue its evolution towards a revolution. It must not make the mistake it has in the past of stopping a process in mid stride, shifting direction, and then restarting a process--as it did when it stopped its RML cold in order to focus on the Stryker Brigade--a success for sure, but really a newly fielded piece of equipment rather than a new way of fighting. Finally, it needs to take advantage of the wealth of knowledge that exists within the force and assign them in positions where they can make significant impacts to the logistics structure. There are platoon leaders today who have more operational experience than battalion commanders in the early 90s.

Recommendations

Topics for further research include an analysis into how the United States Marine Corps conducts logistics and what steps it is taking, if any, to transform. Although the Army's move from a division to brigade centric force is new, the Marines, an expeditionary force by nature, have been using this model, along with their own version of the ARFORGEN for years with their Marine Air Ground Task Forces (MAGTF). By determining where Army logistics transformation is simply adapting practices of sister services, lessons can be learned from their successes and failures that can be adapted to the Army's current transformation.

In chapter 1, the Army's attempt to implement business practices following ODS were discussed in detail and throughout the thesis, ongoing adoption of business practices have been highlighted. However, commercial business practices are not in the curriculum of the logistics officer education system. The Army Logistics Management College, the Army's executive agent for logistics education, teaches over 70 courses on logistics to military (U.S. Army, joint and coalition partners) and civilians. An analysis of curriculums and recommended additions to the current officer education system would produce more capable logistics leaders that would make achieving stated transformation goals easier.

Finally, in several instances throughout the thesis, the term Joint Logistics Corps has been mentioned. Below is a concept for such a corps.

Joint Logisticians

In order for a repair part to move from its industrial base, it could conceivably travel through three services. First, if it is a part delivered directly from the vendor, it

may travel by commercial carrier from its point of manufacture to an Aerial or Sea Port of Embarkation (APOE-SPOE). Second, it either travels by air or sea LOC to a port of debarkation. Finally, it travels to the point of consumption. The bottom line is that, unless that resupply action comes from a warehouse within theater (and it had to get there somehow), it is going to be a joint operation. So what is the military doing to make logisticians more joint? Nothing.

As a result of the BRAC Commission report, several schools within the armed forces are becoming joint. For example, Fort Lee will become the home for joint transportation-management training and culinary training and Fort Jackson, SC will become the center for joint religious training and education at Fort Jackson, S.C. Add to this list schools that are already this to schools that are already joint such as the United States Army Airborne School, Field Artillery School, Explosive Ordnance Disposal School and an excellent argument exists for the establishment of a joint logistics center of excellence. In an article in Joint Forces Quarterly, Randall Maudlin has proposed a training and education model for logisticians (see figure 11). This model provides for the education of officers and enlisted personnel and integrates commercial practices into education on joint doctrine.

Proposed Training and Education for Logisticians

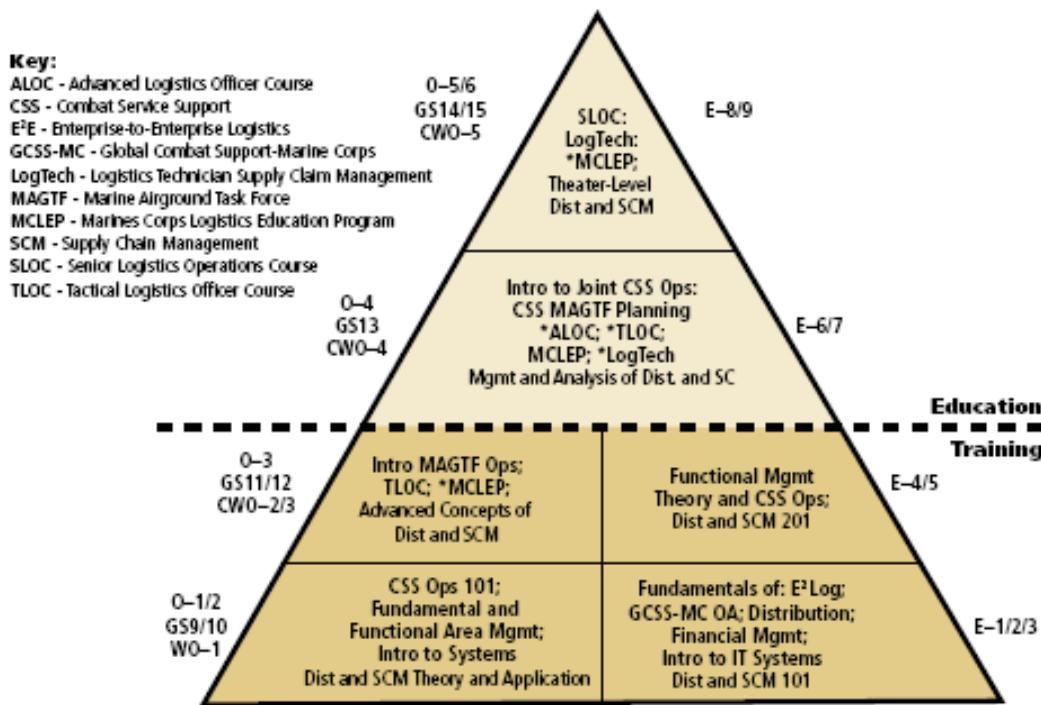


Figure 11. Proposed Training and Education Model for Logisticians

Source: Randall M. Mauldin, "Development of the Joint Logistician," *Joint Forces Quarterly* (4th Quarter, FY 2005): 27.

Finally, this research was broad in scope. Any aspect of this research, from the comparison and validation of the Brigade Support Battalion and Forward Support Battalion to an analysis of emerging materiel solutions and their contribution to achieving one of the tenets of logistics transformation could merit a thesis level work. Each, researched carefully, would contribute to the academic community and discussion on this topic.

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USACGSC
1 Reynolds Ave.
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